



RF/RMRS-97-135

**INTERIM MEASURE/INTERIM REMEDIAL ACTION PLAN  
FOR THE 886 CLUSTER  
Revision 0**

Rocky Mountain Remediation Services, L.L.C.

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## ACRONYMS

ACE	Activity Control Envelope
AHA	Activity Hazard Analysis
ARAR	Applicable or relevant and appropriate requirements
APEN	Air Pollutant Emission Notice
CA	Contaminated Area
CCR	Colorado Code of Regulations
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
cm <sup>2</sup>	square centimeters
CWTF	Consolidated Water Treatment Facility
dpm	disintegrations per minute
DOE	Department of Energy
EDE	Effective Dose Equivalent
EPA	Environmental Protection Agency
EWP	Enhanced Work Planning
ft	foot/feet
ft <sup>2</sup>	square feet
HEPA	High Efficiency Particulate Air
HEUN	Highly Enriched Uranyl Nitrate
HSP	Health and Safety Procedures
HASP	Health and Safety Plan
IA	Industrial Area
IMIRA	Interim Measures/Interim Remedial Action
ISM	Integrated Safety Management
IWCP	Integrated Work Control Program
LDR	Land Disposal Restriction
LLW	Low-level Waste
mrem	millirem
nCi/g	nanoCurie per gram
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
PCBs	Polychlorinated biphenyls
ppm	parts per million
PU&D	Property Utilization and Disposal
QA	Quality Assurance
QC	Quality Control
RLCP	Reconnaissance Level Characterization Plan
RLCR	Reconnaissance Level Characterization Report
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RMRS	Rocky Mountain Remediation Services, L.L.C.

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## ACRONYMS (continued)

RFETS	Rocky Flats Environmental Technology Site
SSOC	Safe Sites of Colorado, Inc.
TBC	To-be-Considered
TRU	transuranic
TSCA	Toxic Substances Control Act
TU	Temporary Unit
WAC	Waste Acceptance Criteria
WBGT	Wet Bulb Globe Temperature
yr	year

## EXECUTIVE SUMMARY

This Plan serves as the Decision Document for the removal actions associated with the 886 Cluster. It outlines the approach and applicable requirements that will be used in decontamination and decommissioning of the 886 Cluster. The 886 Cluster is located in the Rocky Flats Environmental Technology Site industrial area at the east central portion of the site. The buildings associated with the cluster are 886, 888, 888A, 880, 875, and T886A. The cluster also includes an outdoor concrete pit containing two, raschig ring tanks referred to as building 828, and an underground tunnel linking the Air Filter Plenum Building (875) with Building 886.

Because Building 886 and its associated facilities currently have no anticipated future mission, the cluster is proposed for decontamination and decommissioning to reduce maintenance costs and to eliminate hazards within the cluster's buildings. Consistent with the Rocky Flats Cleanup Agreement (RFCA), the 886 Cluster Project is being conducted as a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) removal action (RFCA ¶ 70). This action will be conducted as an Interim Measure/Interim Remedial Action (RFCA Part 9, Subpart B). This effort will be executed as reflected in the RFETS Project Closure Baseline schedule. Given the small size of the cluster, this project also serves as a pilot in preparation and anticipation of large-scale decommissioning that will be conducted in the future.

The findings from the reconnaissance level characterization are summarized in Section 2.0 for each building within the 886 Cluster. The hazards are delineated in terms of physical, radiological, lead, metals, and polychlorinated biphenyls. The hazards identified represent those that are anticipated at the initiation of decontamination and decommissioning. For this purpose all deactivation is assumed to have occurred.

The evaluation of the scope of work for the 886 Cluster considered the following three alternatives:

1. Alternative 1 - Decontamination and decommissioning of the 886 Cluster
2. Alternative 2 - No Action with Safe Shutdown Maintenance
3. Alternative 3 - Reuse of the 886 Cluster Facilities

The alternatives were evaluated for effectiveness, implementability and relative costs (Section 3.0). Alternative 1 is the proposed alternative. The objectives of the action are to support release of the cluster for demolition. As discussed in Section 4.0, to aid in the accomplishment of these objectives, the project strategy is to first divide the 886 Cluster into manageable sub-areas. Area-specific work plans will be developed during planning and engineering for each major activity. Within the area-specific work plans, the area-specific components such as waste management, health and safety, and decontamination strategy, if necessary, will be expanded upon.

To comply with applicable health and safety requirements, an integrated safety management process will be implemented. The integrated safety management process is structured around five core principles (1) define the scope of work, (2) analyze hazards, (3) develop and implement controls, (4) perform work within controls, and (5) provide feedback and continuous improvement (Section 5.0). The process will facilitate work by identifying key hazards up front and incorporating risk management into the job planning process.

The waste generated by the project will be managed by properly trained personnel in accordance with applicable site, state and federal regulations (Section 6.0). Decontamination and decommissioning actions will attain, to the maximum extent practicable, compliance with the substantive aspects of the federal and state applicable or relevant

and appropriate requirements. The requirements relating to this proposed action are identified whether the requirement is applicable or relevant, and appropriate, or To-Be-Considered. Pursuant to RFCA ¶16, the procedural requirements to obtain federal, state, or local permits are waived as long as the substantive requirements that would have been imposed in the permit process are identified and explained (RFCA ¶17). The Plan satisfies the permit waiver requirements in RFCA (Section 7.0).

The National Environmental Policy Act (NEPA) requires that actions conducted at the RFETS consider potential impacts to the environment. The Memorandum of Secretarial Officers and Heads of Field Elements, dated June 13, 1994, issued by the Secretary of Energy, Hazel O'Leary and entitled "The National Environmental Policy Act Policy Statement" defines the DOE policy for integrating the NEPA process into the CERCLA decision making process. While no separate NEPA documentation is required for this effort, RFCA (and DOE policy) requires DOE to consider environmental impacts of the proposed action and of alternatives as part of this document (Section 8.0).

The quality assurance program for the project is described in Section 9.0. A commitment to program quality and continuous improvement is applied at all levels from project start through project completion. Adherence to the commitment is instrumental in the success of the project. All project personnel are responsible for following approved quality assurance program requirements and participating in quality improvement activities.

It is anticipated that the decontamination and decommissioning of the 886 Cluster will require 18 months to complete. This proposed schedule (Section 10.0) is subject to change due to regulatory and public concerns, budgetary constraints, and other factors such as weather delays.

Comments and questions on the Plan, submitted during the formal comment period, including those provided during the public meetings have been categorized, along with the response, in this revision to the Interim Measures/Interim Remedial Action.



## 1.0 INTRODUCTION

The Building 886 Cluster (Figure 1-1) is comprised of buildings 886, 888, 888A, 880, 875, T886A, and 828 and an underground tunnel with ventilation ducts that connect Building 886 to Building 875 (Figure 1-2). Because Building 886 and its associated facilities have no future mission, the cluster is proposed for decontamination and decommissioning to reduce operating costs and to eliminate hazards within the cluster's buildings. Consistent with the Rocky Flats Cleanup Agreement (RFCA) (Department of Energy [DOE] 1996), the 886 Cluster Project is being conducted as a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) removal action RFCA ¶ 70. This action will be conducted as an Interim Measure/Interim Remedial Action (IM/IRA) due to the estimated time (> 6 months) from commencement of physical remedial work to completion (RFCA Pat 9, Subpart B). The 886 Cluster removal action is one of the first decommissioning activities at Rocky Flats Environmental Technology Site (RFETS) selected to meet the Site's closure goal. This effort will be executed with respect to the RFETS Project Closure Baseline schedule and reduce the landlord costs associated with the cluster. Given the small size of the cluster, this project also serves as a pilot in preparation and anticipation of large-scale decommissioning that will be conducted in the future. Deactivation, which precedes decommissioning, of the 886 Cluster was initiated in Fiscal Year (FY) 1997 with anticipated completion during calendar year 1998.

### 1.1 Purpose

This IM/IRA serves as the Decision Document for removal actions associated with the 886 Cluster. The IM/IRA Plan outlines the approach and applicable requirements that will be used in decontamination and decommissioning of the 886 Cluster. The IM/IRA of the 886 Cluster buildings will be conducted in accordance with RFCA (DOE 1996) and the applicable or relevant and appropriate requirements (ARARs) of federal, state, and local regulations. The action will be conducted in a manner that is protective of site workers, the public, and the environment. Reconnaissance level characterization data collected and presented in the *Reconnaissance Level Characterization Report (RLCR) for the 886 Cluster Decommissioning Project* (Rocky Mountain Remediation Services [RMRS] 1997a) were used as input to this IM/IRA. The characterization efforts were used to identify the type, quantity, condition, and location of radioactive and hazardous materials which are, or which may be, present as residual contamination in the 886 Cluster facilities. Preliminary estimates of the type of contamination and safety hazards present in the 886 Cluster are summarized in the RLCR. Additional surveys, referred to as "in-process characterization," will be employed to characterize contamination, as well as physical safety hazards, throughout the decontamination and decommissioning process.

### 1.2 Scope

The scope of the IM/IRA includes decontamination, as necessary, of any remaining structures and decommissioning which includes dismantling and demolishing the facilities. This effort will remove the 886 Clusters facilities' aboveground structures and, with the exception of Building 886, remove building slabs and stabilize underground structures by backfilling with clean fill or, if appropriate, recyclable building material (i.e., rubble which meets unrestricted release criteria (see Section 4.0, Table 4-6). Utilities will be capped at ground surface but not removed. This project also includes characterization of the Building 886 slab and native soils under the former building slabs for the other buildings in the cluster. Characterization activities will be performed in cooperation with environmental restoration activity at RFETS and, prior to performance, a Sampling and Analysis Plan will be developed and provided to the Lead Regulatory Agency (LRA) for review. Site characterization will be used to guide reclamation. Ranking for Environmental Restoration priority will be based on contamination levels found, if any.

Documents which have been prepared prior to the IM/IRA, have been prepared in conjunction with the IM/IRA, or will be prepared on an activity-specific basis are as follows:

- Reconnaissance Level Characterization Plan - The Reconnaissance Level Characterization Plan (RLCP) details the data requirements and methodology for characterization of the cluster. The RLCP was prepared and implemented prior to the IM/IRA.
- Reconnaissance Level Characterization Report - The RLCR presents the historical data and process information pertaining to the 886 Cluster, and provides a baseline of information for hazards within the building cluster. The RLCR was prepared prior to the IM/IRA.
- Health and Safety Plan - The Health and Safety Plan (HASP) identifies potential safety and health hazards associated with the closure project. Procedures and controls identified in the HASP help reduce the risk of personnel injury and/or illness, property damage, and environmental impact. The HASP was prepared concurrently with the IM/IRA. Task-specific Activity Hazard Analyses (AHAs) are added as they are developed.
- Waste Management Plan - The Waste Management Plan (WMP) provides estimates of the quantity and types of waste anticipated to be generated, and describes the methods for managing and minimizing this waste. The WMP was prepared concurrently with the IM/IRA.
- Quality Assurance Project Plan - The Quality Assurance Project Plan (QAPP) identifies the quality assurance (QA) criteria and requirements as defined in 10 CFR 830.120, and describes the process by which these requirements are met. The QAPP was prepared concurrently with the IM/IRA.
- Integrated Work Control Program Work Package(s) - The Integrated Work Control Program (IWCP) Work Package details the work instructions for each closure activity or task. IWCP Work Packages and the steps contained therein are developed as part of the Integrated Safety Management (ISM) Process. IWCP Work Packages are developed prior to conducting a specific activity or task.
- Activity Hazard Analysis - An AHA is required for each task or activity. Each AHA identifies the principal steps involved in each task or activity, the potential safety and health hazards associated with each step, the specific controls and monitoring associated with each potential hazard, the task-specific special equipment to be used in performing the activity and any additional training requirements. AHAs are developed just prior to conducting a specific activity and appended to the HASP.
- Radiological Work Permit - The Radiological Work Permit (RWP) describes the radiological conditions and instructions on a task- or activity -specific basis to control access to radiologically controlled area(s), ensure proper personal protective equipment (PPE) is used given the radiological conditions, and outlines the proper dosimetry requirements. RWPs are developed prior to conducting a specific activity.
- Final Survey Plan - The Final Survey Plan documents the planned characterization activities to assess radiological contamination prior to demolition and will incorporate by reference the site Radiation Control Manual and approved Radiological Safety Practices that will be used during implementation.

- Final Survey Report - The Final Survey Report presents the results of the final survey with respect to the radiological and/or chemical contaminants. The Final Survey Report is included as part of the project's administrative record.
- Sampling and Analysis Plan(s) - The Sampling and Analysis Plan documents the planned environmental characterization activities to be performed in cooperation with environmental restoration activities. Sampling and Analysis Plan(s) will be developed for each of the cluster areas and appended to the area-specific work plans. Ranking for Environmental Restoration priority will be based on contamination levels found, if any.

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***Figure 1-1. 886 Cluster Location at RFETS.***

***Figure 1-2. 886 Cluster.***

## 2.0 CLUSTER DESCRIPTION

The construction of Buildings 886, 875, and 888A was completed in 1964 and commissioned in 1965. The trailer T886A was located east of Building in approximately 1980; a breezeway connected the two at a later date. The purpose of the 886 Cluster was to conduct criticality experiments on liquids, powder, and solid forms of fissionable materials. The date of the last criticality experiment was October 1987. These experiments were essential to validate computer models used to establish nuclear criticality safety limits, now called Criticality Safety Operating Limits.

With the exception of T886A, which is being utilized as a project support trailer, the buildings have been vacated. Deactivation activities will be completed prior to implementation of this IM/IRA. The only ongoing operations are those necessary to maintain the safety envelope and comply with the Basis for Interim Operation (BIO) building authorization.

There are no Resource Conservation and Recovery Act (RCRA) designated areas within the 886 Cluster. The 886 Cluster Project is being conducted as a CERCLA removal action. The potential for under building contamination at Building 886 is documented in the Historical Release Report (DOE 1992) and soil surrounding the building is designated as Individual Hazardous Substance Site 164.2, Building 886 Spills. The soil is suspected to be contaminated with uranium. Additionally, given groundwater seepage problems in Buildings 875 and 828, the potential for groundwater contamination from these structures exists.

### 2.1 Physical Description

The 886 Cluster is located in the RFETS industrial area (IA) at the east central portion of the site. It is located just south of Central Avenue and just east of the pedestrian traffic signal. Primary construction materials used in the buildings include concrete masonry, steel, and wood with siding. The buildings associated with the cluster are 886, 888, 888A, 880, 875, and T886A. The cluster also includes an outdoor concrete pit containing two, raschig ring tanks referred to as building 828, and an underground tunnel linking the Air Filter Plenum Building (875) with Building 886. All the structures are single story buildings, with the exception of the criticality laboratory portion of Building 886 which is two stories high. The individual buildings are described in more detail in the following sections.

#### 2.1.1 Building 886

Building 886 contains 10,785 square feet (ft<sup>2</sup>), of which approximately 4,000 ft<sup>2</sup> constitutes the Contaminated Area (CA). Generally, office space comprises the remaining 6,785 ft<sup>2</sup>. The facility has no basement or crawl space (Figure 2-1).

The CA is comprised of three rooms and a hallway (designated as Room 108) all with slightly different construction. (Figure 2-2) Room 101 (2,000 ft<sup>2</sup>), the assembly room where all criticality experiments were performed, has up to 5 foot (ft) thick walls and the north wall is double reinforced concrete. The ceiling (30 ft above the floor) is also 3 ft thick. The floor is concrete. Room 102 (600 ft<sup>2</sup>), a storage vault, was constructed in the middle 1970's to meet DOE requirements for Special Nuclear Material vaults. The walls are double reinforced concrete with a cast integral concrete roof. Room 103 (900 ft<sup>2</sup>), the mixing room, is a fissile solution storage area; it has 3 walls that are reinforced concrete with the west wall constructed of cinder blocks with rebar. The roof is sheet metal with an overlay of tar. Approximately half of the Room 103 floor area is two to four ft below the building's floor level (Figure 2-1).

There have been several incidents where uranyl nitrate was spilled onto the floor of the CA. The largest spill involved between 50 and 60 gallons of solution. The laboratory floors are sealed and bermed to contain such spills and the solution was recovered for further use. None of these incidents resulted in solution escape from the building. In the late 1960's, an accumulation of uranyl nitrate salt was found inside the base of the ventilation system filter plenum outside of Building 886. This accumulation, about one foot square and one-quarter inch thick, is thought to have resulted from an incident in which some solution overflowed into a vent line and dried, with subsequent air flow over the vent carrying the salt to the filter plenum. This ventilation system was removed when the filter plenum facility (Building 875) was placed in operation.

The area outside the CA is comprised of offices, the building entryway, hallways, a utility room (Room 111) and control room (Room 112). The office space is slab on grade and the walls are cinder block with a built-up roof.

### **2.1.2 Building 828**

Building 828 is 170 ft<sup>2</sup> outdoor concrete pit containing two, raschig-ring tanks that have never been used for their intended purpose. However, one of the tanks was used in the past to hold groundwater that has seeped into the pit (Figure 1-2). Currently the tank is maintained, sampled, and pumped in accordance with 886 operational baseline.

### **2.1.3 Building 875**

Building 875 (3,900 ft<sup>2</sup>) is a filter plenum building containing the filters for the Building 886 exhaust system. Considered part of this facility is the tunnel and duct work within the tunnel to Building 886. The duct work in the tunnel and the plenum has HEUN (low level) contamination (Figure 2-3).

### **2.1.4 Building 880**

Building 880 (800 ft<sup>2</sup>) is a metal "Butler" type building 100 feet south of Building 886. Prior to deactivation (Section 1.2), Building 880 stored several items of used experimental equipment awaiting anticipated disposal. Some of the items may be slightly contaminated with highly enriched uranyl nitrate (HEUN) (Figure 1-2).

### **2.1.5 Building T886A**

Building T886A (1,960 ft<sup>2</sup>) is an office trailer connected to the northeast corner of Building 886. It will continue to serve as office space during project execution and is of standard trailer construction (Figure 2-4).

### **2.1.6 Building 888A**

Building 888A (400 ft<sup>2</sup>) is an electrical substation for the cluster buildings (Figure 1-2).

### **2.1.7 Building 888**

The guard shack (Building 888) located north of Building 888A was not originally included in the 886 Cluster; however, given that its function is associated with that of the 886 Cluster, the building is considered part of this IM/IRA (Figure 2-5).

***Figure 2-1. Building 886.***



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***Figure 2-2. CA within Building 886.***

***Figure 2-3. Building 875.***

***Figure 2-4. Building T886A.***

***Figure 2-5. Building 888.***

## 2.2 Reconnaissance Level Characterization Summary

The reconnaissance level characterization of the Building 886 Cluster includes a review of historical records and the collection of process knowledge information covering the operational time period for the facility from original construction to present. This information was evaluated to identify data needs for the characterization effort (RMRS, 1997a). As part of the characterization, comprehensive, physical inspections of all accessible areas of the 886 Cluster were performed. The primary purpose of these inspections were:

- confirm the accuracy of file documentation of as-built or modified facility construction, equipment installations, and general facility conditions;
- obtain volume estimates for wastes that will be generated during removal activities;
- identify equipment, structures, process lines, and associated items that will require hazardous and/or radioactive surveys and analytical sampling to further characterize the cluster;
- identify potential sources of lead and asbestos;
- identify potential chemical contamination;
- identify physical hazards;
- locate, identify, and document any facility condition or problem situation which had not been previously identified or otherwise documented in appropriate building records or files; and
- identify equipment, structures, process lines, and associated items which require field surveys and/or analytical sampling for the purpose of characterizing the cluster for radioactive and hazardous contaminants.

As indicated above, the characterization includes the identification of potential sources of chemical contamination. To accomplish this, the characterization effort also involved the development and execution of a *RLCP for the 886 Decommissioning Project* (RMRS 1997b). The characterization strategy was based on the data needs identified in the RLCP from a data quality objective development process. The RLCP identified potential contaminants of concern for the cluster facilities based on process knowledge and delineated a sampling program to characterize their occurrence. The contaminants of concern identified in the RLCP were radiological, asbestos, polychlorinated biphenyls (PCBs), lead, and other metals. The plan, and sampling and analysis protocols contained therein, was reviewed and approved. Existing radiological contamination was characterized by process knowledge and existing surveys. Decontamination and decommissioning will reduce the levels of radiological contamination. Implementation of the Final Survey Plan will characterize the radiological contamination prior to demolition and will be performed in accordance per the site Radiation Control Manual and approved Radiological Safety Practices.

The findings from the reconnaissance level characterization, modified based on the performance of activities (i.e., asbestos abatement) or additional data acquisition, to reflect the activities to be addressed during planning and prior to commencement of decontamination and decommissioning (i.e., asbestos abatement), are summarized for each building within the 886 Cluster and presented in Tables 2-1 through 2-6. The hazards are delineated in terms of physical, radiological, lead and metals, and PCBs. As summarized in the RLCR (RMRS 1997a), a radiological hazard exists if contamination is present above the unrestricted release criteria presented in Table 4-6. A lead/metals hazard is identified if analytical results for metals indicate concentrations above the corresponding RCRA limits. As indicated on Table 2-1 through 2-6, the lead/metals hazards are exclusively attributable to paint. The hazard is identified as such because, if removed, the waste would be regulated as hazardous waste. A PCB hazard is identified if PCBs are present above 50 ppm. As for the lead/metals hazard, the PCB hazard is primarily attributable to paint and if the paint were removed, the waste generated would be regulated. Also listed, where appropriate, is the major equipment to be addressed (RMRS 1997a).

**Table 2-1. Hazards - Building 886<sup>1</sup>.**

Room	Physical	Radiological	Lead and metals	PCBs	Electrical	Other/Equipment
101	Elevated Platform Overhead equipment Overhead crane Fall potential	CA; Fixed and removable contamination.	Paint	Purple paint from HEUN lines; Green paint on electrical boxes; hexane swipe from hydraulic pump for the horizontal split table	Conduit function boxes and control wire	Raschig ring tanks SCRAM tank Annular tank Piping Walk-in assembly hood Horizontal split table Vertical split table Solution base Water reflector apparatus Elevated Platform Concrete Reflector Pads (8) Hydraulic unit (1) Solution transfer pump (4)
102	None	CA ; Removable contamination in floor	Paint	None	None	None
103	Ladder Protruding pipes and valves	CA; Fixed and removable contamination.	Paint	Purple paint from HEUN lines; Green paint from electrical utility boxes	Junction boxes, wiring, conduit	Solution pumps (2) Piping Stainless steel tanks Glovebox type enclosure (2) Hydraulic unit (2)
108	None	CA; Fixed and removable contamination	Paint	Green paint from electrical utility boxes	Junction boxes, wiring, conduit, security alarm	None
110 111	None Sharpedges Sharp corners Protruding pieces of equipment, pipes valves	None None	Paint Paint	None Green paint from electrical boxes; Gasket material from vibrator damper >50 parts per million (ppm)	Conduit Equipment, electrical panels -480 kV; Criticality panel	None Ventilation ductwork Air compressor (2)
112	Control boxes Sheet metal Sharpedges	None	Paint Circuit boards	None	Control boxes, electrical panels -480 kV	Reactor control console
All other	Sheet metal with sharp edges	None	Paint	None	Wiring in walls	Security Fire alarm One cylinder compressed nitrogen gas

<sup>1</sup>Building 886 has a built up roof system that was specified as containing asbestos in the felt and tar. As such, the roof is assumed to be asbestos containing without the need of sampling. Tar impregnated roofing felts may be disposed of with normal demolition debris under most circumstances.

**Table 2-2. Hazards - Building 828.**

Physical	Radiological	Lead and Metals	PCBs	Electrical	Other/Equipment
Confined space; fall; protruding pipes and valves, slips, spiders	Potential from groundwater seepage.	None	None	None	Pumps (electric motors) Raschig ring tank

**Table 2-3. Hazards - Building 875.**

Physical	Radiological	Lead and Metals	PCBs	Electrical	Other/Equipment
Noise; Sharp protruding edges	CA – filter plenum Tunnel	Paint	None	Equipment; electrical panels 480 Volt	Raschig rings tank  Fire control panel; fire suppression system

**Table 2-4. Hazards - Building 880.**

Physical	Radiological	Lead and Metals	PCBs	Electrical	Other/Equipment
Trip and fall; protruding edges	Potential from previous radiological activities	None	None	None	None

**Table 2-5. Hazards - Building T886A.**

Physical	Radiological	Lead and Metals	PCBs	Electrical	Other/Equipment
None	None	None	None	None	None

**Table 2-6. Hazards - Building 888A and 888.**

Physical	Radiological	Lead and Metals	PCBs	Electrical	Other/Equipment
Razor Wire	None	None	None	13.8 kilovolt Substation	None

The radiological areas of concern within the cluster are generally identified as CAs on Tables 2-1 and 2-5. The CA within Building 886 is comprised of three rooms and a hallway all with slightly different construction. The CA within Building 875 is the filter plenum. Although not identified as a CA, the tunnel connecting Buildings 886 and 875 is known to have low levels of contamination. Contamination levels for each is discussed below.

Area maps of the CAs are posted in the buildings and are available. Contamination within a CA is within the limits of <2000 disintegrations per minute (dpm) /100 square centimeter (cm<sup>2</sup>) and are posted as such. Thus the CAs in Buildings 886 and 875 are maintained below these levels of contamination.

The two posted HCAs in Building 886 are the Assembly hood (doghouse) and the downdraft table with attached glovebox. Contamination levels (maximum known) within these two areas are 4E6 dpm/100 cm<sup>2</sup> and 60,000 dpm/100 cm<sup>2</sup>, respectively. Isotopes of concern are Pu, Am, and U-235. Most of the contamination is loose on surfaces or components; however, there are areas such as the 103 pit and the floor of the doghouse that have fixed contamination. The location of the hold-up within various systems is known; however, the final NDA measurements are classified.

The tunnel linking the Air Filter Plenum Building (875) with Building 886 is also a radiological concern. Existing survey data presented in RLCR Appendix A (RMRS 1997a) indicate that measurements in the tunnel range from 0 to 56 dpm direct alpha; 0 to 42 dpm/100 cm<sup>2</sup> removable beta; 0 to 6 dpm/100 cm<sup>2</sup> removable alpha.



### 3.0 ALTERNATIVE ANALYSIS

Several alternatives were considered for the near-term management of the 886 Cluster. The preamble to RFCA and the RFETS' Vision statement both contain the objective that buildings will be decontaminated as required for future use or demolition. The evaluation of the scope of work for the 886 Cluster considered the following three alternatives:

- 1? Alternative 1 - Decontamination and decommissioning of the 886 Cluster
- 2? Alternative 2 - No Action with Safe Shutdown Maintenance
- 3? Alternative 3 - Reuse of the 886 Cluster Facilities

The alternatives were evaluated for effectiveness, implementability and relative costs. The results of the alternative analysis are summarized in Table 3-1. Alternative 1 is the selected alternative. Decontamination and decommissioning of the 886 Cluster clearly supports the RFETS' vision of safe, accelerated, and cost effective closure. The alternative has the lowest life cycle costs, achieves risk-reduction the fastest, and is integrated with the operations of the Site. This alternative also maintains long-term protectiveness of public health and the environment. Short term impacts to the environment (i.e., impacts during the duration of the action) can be physically and administratively controlled. There are no significant negative aspects to decontamination and decommissioning of the cluster at this time. By removing this cluster consequently, the site risk is reduced. This path is in line with the goal to close RFETS by year 2006. Funds made available in the future by performing the cluster decommissioning early will be used to reduce other Site risk.

Alternative 2, No Action with Safe Shutdown Maintenance, does not immediately achieve the RFETS' goals. The alternative does not accomplish accelerated closure and defers decontamination and decommissioning. This results in an increase in the life-cycle cost of closure. The short-term protectiveness of human health and the environment is achieved by inaction because the cluster is maintained in a safe and stable configuration. However, the protectiveness of Alternative 2 is only achieved until the time the cluster is decommissioned. Waste and debris requiring treatment and/or disposal, and the risks associated with managing them are not eliminated from the cluster closure under this alternative.

Alternative 3 is not feasible as evident in evaluations that indicate reuse of the 886 Cluster is not required or beneficial. As with Alternative 2, implementation of this action will result in the deferral, not elimination, of eventual decontamination and decommissioning of the cluster is necessary to achieve the RFETS' vision.

**Table 3-1. Alternative Analysis Summary.**

Alternative	Description	Effectiveness	Implementability	Relative
1 – Decontamination and Decommissioning	Decontamination and decommissioning activities will follow area-specific plans approved by the DOE and Colorado Department of Health and Environment (CDPHE). Activities consist of : Additional decontamination (i.e., post-deactivation) as deemed necessary; decommissioning to include dismantlement, demolition, waste generation. Any remediation waste generated by decommissioning would be transported to an appropriate facility for storage followed by disposal.	Decontamination and decommissioning is effective in achieving the long-term goals of the Rocky Flats Vision by not only decontaminating the buildings but also demolishing the aboveground structures to grade and removing or stabilizing underground structures. The mortgage costs of the cluster are eliminated and the risk remaining following the action will be significantly lower than the risk that exists under the current condition.	Technology currently exists to achieve the objectives of this alternative both technically and administratively. Integration with other site activities (e.g., waste storage capacity) can be accomplished. RFCA establishes the cleanup levels.	Decontamination and decommissioning life-cycle costs ultimately go through incorporation into the baseline decommissioning only minimum needs
2 – No Action with Safe Shutdown Maintenance	No action will maintain the 886 Cluster facilities in their current configuration. No additional equipment would be removed unless the present safe shutdown status of the facility became compromised.	No action will delay decommissioning activities and meeting the goals of the Rocky Flats vision. The alternative is effective in achieving the near-term goal identified in the RFCA preamble. Deferring the decommissioning of the 886 Cluster could make funding available to other removals. Long-term goals could be jeopardized if the structural integrity of the mothballed buildings increases risk to workers and the environment.	Administratively, this alternative is not ideally implementable because the integrated sitewide baseline has planned for the decommissioning of the 886 Cluster to occur early in the Site closure. No Action could cause a disruption to the long-term goals for RFETS.	No action cycle costs (adjusted addition costs not mothballed continuity until determined

**Table 3-1. Alternative Analysis Summary (Continued).**

Alternative	Description	Effectiveness	Implementability	Relative
3- Reuse	Reuse of the 886 Cluster would keep the facilities in their current configuration. A new mission for the facilities would be assigned by the Site Utilization Review Board. Depending on the nature of the new mission, additional removal of equipment may be necessary. The current configuration utilities and equipment would be maintained until a new 886 Cluster mission was defined	Reuse of the 886 Cluster was evaluated by the Sites Facilities Use Committee and it was determined that there was not further mission for the 886 Cluster. Use of the 886 Cluster for an alternative off-site use was evaluated in accordance with DOE Order 4300.1C, Subparagraph g, Disposal of Government-Owned Land Improvements. No future use was identified through this evaluation.	Because no new mission has been identified for the 886 Cluster, and because the site-wide integrated baseline has identified the decommissioning of this area in the near future, implementing this alternative is not feasible nor reasonably foreseeable at this time.	This alte the great reuse mi expendit the build landlord/ then the (adjuste the new the build

## 4.0 PROJECT APPROACH

Decontamination and decommissioning was selected as the preferred alternative for the 886 Cluster as discussed in the alternative analysis (Section 3.0). The objectives of the action are to support release of the cluster for demolition. To accomplish these objectives, the 886 Cluster is divided into manageable areas. The following areas within the 886 Cluster have been identified:

- Buildings 886, 828, tunnel
- Buildings 875
- Buildings 880
- Building T886A
- Building 888A, 888

### 4.1 Proposed Action Objectives

The objectives of the action are to:

- decontaminate the facilities (as necessary) to support release for decommissioning per site approved procedures;
- decommission the 886 Cluster facilities in accordance with RFCA and ARARs;
- demolish the 886 Cluster facilities to grade with the exception of Building 886 where the slab will remain; subsurface structures will be backfilled with clean fill or, if appropriate, recyclable building material (i.e., rubble which meets unrestricted release criteria (Table 4-6);
- in cooperation with Environmental Restoration, characterization of the Building 886 slab and native soils under the former building slabs for the other buildings in the cluster.
- in cooperation with Environmental Restoration and based on determined priority ranking, reclaim the site by re-contouring and re-vegetation; and
- complete the decontamination and decommissioning activities in a manner that is protective of site workers, the public, and the environment

The phases of the project and associated tasks are expressed in terms of planning and engineering, decontamination, decommissioning, and demolition. The phases and activities associated with each phase are presented, by area, on Tables 4-1 through 4-5. The phases are supported by release criteria (Section 4.1.1) and decontamination options (Section 4.1.2) to be considered and potentially implemented. All decontamination will proceed to free release conditions when economically feasible. If free release conditions are not attained, the material will be handled, packaged, and disposed as radioactive waste. Additionally, as contaminant conditions change as decontamination progresses, the preventative measures to mitigate hazards posed from these activities will be modified as appropriate based on the activity-specific Activity Hazard Analysis (AHA).

Prior to demolition, the final survey will be performed to demonstrate that the radiological and/or chemical contaminants have been reduced to levels that comply with the established release criteria. The final survey will be planned and conducted using the guidance provided in the MARSSIM. The Final Survey Report will be included as part of the project's administrative record.

**Table 4-1. Buildings 886, 828 and Tunnel.**

Building/Room	Phase	Activity
886/101	Planning and Engineering	Perform Internal Management Review Develop Area- specific work plan Develop IWCP Work Packages (as required) Develop Characterization Survey Develop Activity Hazards Analysis Develop Technical Operations Orders
886/101	Decontamination	Conduct characterization surveys Decontaminate structures as needed: <ul style="list-style-type: none"> <li>• Radiological contamination - walls</li> <li>• Radiological contamination - floors</li> <li>• Radiological contamination – ceilings</li> <li>• Lead/metals in paint – walls</li> <li>• Lead/metals in paint – floors</li> <li>• PCBs - Purple paint from HEUN lines</li> <li>• PCBs - Green paint on electrical boxes</li> <li>• Rashig ring tanks</li> <li>• SCRAM tank</li> <li>• Annular tank</li> <li>• Piping</li> <li>• Walk-in assembly hood</li> <li>• Horizontal split table (Note: PCBs detected in hexane swipe from hydraulic pump for the horizontal split table)</li> <li>• Vertical split table</li> <li>• Solution base</li> <li>• Water reflector apparatus</li> <li>• Elevated platform</li> <li>• Concrete Reflector Pads (8)</li> <li>• Hydraulic unit (1)</li> <li>• Solution transfer pump and hold-up</li> </ul> Package decontamination waste Ship decontamination waste
886/101	Dismantlement	Perform DOE/K -H Management Review Dismantle and package wall on assembly hood Dismantle, size reduce, and package assembly hood Dismantle and package Tanks T1/T2 Dismantle and package Scram Tank Ship assembly hood, Tanks T1/T2 and Scram Isolate room Drain hydraulic pumps and lines Survey, disassemble, and package vertical table Disassemble and package pumps and associated equipment Ship vertical table, pumps, and associated equipment Disassemble, package, and ship miscellaneous air lines and power boxes Disassemble, survey, and package electronics Ship electronics to PU&D Scabble designated areas on floor Survey Room
886/102	Planning and Engineering	Perform Internal Management Review Develop Area- specific work plan Develop IWCP Work Package Develop Characterization Survey Develop Activity Hazards Analysis

**Table 4-1 (continued).**

886/102	Decontamination	<p>Conduct characterization surveys</p> <p>Decontaminate structures as needed</p> <ul style="list-style-type: none"> <li>• Radiological contamination on floor</li> <li>• Lead/metals in paint – walls</li> </ul> <p>Package decontamination waste</p> <p>Ship decontamination waste</p>
886/102	Dismantlement Room 102	<p>Remove and package shelves</p> <p>Remove and package intake air ventilation system</p> <p>Ship shelves and ventilation</p> <p>Disassemble, survey, and package electronics</p> <p>Ship electronics to PU&amp;D</p> <p>Survey Room</p>
886/103/108	Planning and Engineering	<p>Perform Internal Management Review</p> <p>Develop Area- specific work plan</p> <p>Develop IWCP Work Package</p> <p>Develop Characterization Survey</p> <p>Develop Activity Hazards Analysis</p>
886/103/108	Decontamination	<p>Conduct characterization surveys</p> <p>Decontaminate structures as needed</p> <ul style="list-style-type: none"> <li>• Radiological CA - removable contamination – walls (103)</li> <li>• Radiological CA - fixed and removable – floor (103 and 108)</li> <li>• Lead/metals in paint – walls (103 and 108)</li> <li>• PCBs - Purple paint from HEUN lines</li> <li>• PCBs - Green paint from electrical utility boxes (103 and 108)</li> <li>• Solution pumps (2)</li> <li>• Piping</li> <li>• Stainless steel tanks (11)</li> <li>• Glovebox type enclosure (2)</li> <li>• Hydraulic unit (2)</li> </ul> <p>Package decontamination waste</p> <p>Ship decontamination waste</p>
886/103/108	Dismantlement	<p>Perform DOE/K -H Management Review</p> <p>Disassemble, size reduce, and package glovebox</p> <p>Disassemble, size reduce, and package downdraft</p> <p>Disassemble, size reduce, and package SS Room</p> <p>Remove and package cabinets</p> <p>Remove and package hood</p> <p>Remove and package HEUN tanks</p> <p>Ship cabinets, hood, and tank</p> <p>Disassemble, package, and ship shower and miscellaneous equipment</p> <p>Disassemble, survey, and package electronics</p> <p>Ship electronics to PU&amp;D</p> <p>Survey Rooms</p>
886/111	Planning and Engineering	<p>Perform Management Review</p> <p>Develop Area- specific work plan</p> <p>Develop IWCP Work Package</p> <p>Develop Characterization Survey</p> <p>Develop Activity Hazards Analysis</p>

**Table 4-1 (continued).**

886/111	Decontamination	<p>Conduct characterization surveys</p> <p>Decontaminate structures as needed</p> <ul style="list-style-type: none"> <li>• Lead/metals in paint - walls</li> <li>• Green paint from electrical boxes</li> <li>• Gasket material from vibrator damper &gt;50 parts per million (ppm)</li> <li>• Ventilation ductwork</li> <li>• Air compressor (2)</li> </ul> <p>Package decontamination waste</p> <p>Ship decontamination waste</p>
886/111	Dismantlement	<p>Disassemble, survey, and package electronics</p> <p>Ship to electronic PU&amp;D</p> <p>Survey Room</p>
886/112	Planning and Engineering	<p>Perform Internal Management Review</p> <p>Develop Area- specific work plan</p> <p>Develop IWCP Work Package</p> <p>Develop Characterization Survey</p> <p>Develop Activity Hazards Analysis</p>
886/112	Decontamination	<p>Conduct characterization surveys</p> <p>Decontaminate structures as needed</p> <ul style="list-style-type: none"> <li>• Lead/metals in paint - walls</li> <li>• Lead/metals circuit boards</li> <li>• Reactor control console</li> </ul> <p>Package decontamination waste</p> <p>Ship decontamination waste</p>
886/112	Dismantlement	<p>Disassemble, survey, and package electronics</p> <p>Ship to electronic PU&amp;D</p> <p>Survey Room</p>
886/General Office	Planning and Engineering	<p>Perform Internal Management Review</p> <p>Develop Area- specific work plan</p> <p>Develop IWCP Work Package</p> <p>Develop Characterization Survey</p> <p>Develop Activity Hazards Analysis</p>
886/General Office	Decontamination	<p>Conduct characterization surveys</p> <p>Decontaminate structures as needed</p> <ul style="list-style-type: none"> <li>• Lead/metals in paint - walls</li> <li>• One cylinder compressed nitrogen gas</li> </ul> <p>Package decontamination waste</p> <p>Ship decontamination waste</p>
886/General Office	Dismantlement	<p>Disassemble, survey, and package electronics</p> <p>Ship to electronic PU&amp;D</p> <p>Survey Room</p>
828	Planning and Engineering	<p>Perform Internal Management Review</p> <p>Develop Area- specific work plan</p> <p>Develop IWCP Work Package</p> <p>Develop Characterization Survey</p> <p>Develop Activity Hazards Analysis</p>
828	Decontamination	<p>Conduct characterization surveys</p> <p>Decontaminate structures as needed</p> <ul style="list-style-type: none"> <li>• Pumps (electric motors)</li> <li>• Rashig ring tank</li> </ul> <p>Package decontamination waste</p> <p>Ship decontamination waste</p>

**Table 4-1 (continued).**

828	Dismantlement	Remove and package rings Size reduce and package tanks Ship packaged tanks Survey pit Disassemble, survey, and package electronics Ship to PU&D Survey Room
Tunnel	Planning and Engineering	Perform Internal Management Review Develop Area- specific work plan Develop IWCP Work Package Develop Characterization Survey Develop Activity Hazards Analysis
Tunnel	Decontamination	Conduct characterization surveys Decontaminate structures as needed <ul style="list-style-type: none"> <li>• Radiological contamination – floors</li> </ul> Package decontamination waste Ship decontamination waste
Tunnel	Dismantlement	Disassemble, survey, and package electronics Ship to PU&D Survey Tunnel
886	Demolition	Perform DOE/K -H Management Review Demolish roof, walls, electric, plumbing Backfill and seed
828	Demolition	Sample soil Backfill pit
Tunnel	Demolition	Sample soil and debris Fill tunnel with debris Backfill tunnel



**Table 4-2. Building 875**

Phase	Activity
Planning and Engineering	Perform Internal Management Review Develop Area- specific work plan Develop IWCP Work Package Develop Characterization Survey Develop Activity Hazards Analysis
Decontamination	Conduct characterization surveys Decontaminate structures as needed <ul style="list-style-type: none"> <li>• Radiological contamination filter plenum – walls</li> <li>• Radiological contamination filter plenum – floors</li> <li>• Radiological contamination filter plenum – ceiling</li> <li>• Lead metals paint-walls</li> <li>• Raschig ring tanks</li> </ul> Package decontamination waste Ship decontamination waste
Dismantlement	Disassemble, survey, and package electronics Ship electronics to PU&D Survey Room
Dismantlement - Filters and Plenum	Disassemble, survey, and size reduce filters Package and ship filters Disassemble, survey, and size reduce plenum Package and ship plenum Survey Room Verification Survey - Filters, Plenum
Demolition	Demolish Electric and plumbing to stubs Demolish roof, walls, slab Sample soil Backfill

**Table 4-3. Building 880**

Phase	Activity
Planning and Engineering	Perform Internal Management Review Develop Area- specific work plan Develop IWCP Work Package Develop Characterization Survey Develop Activity Hazards Analysis
Decontamination	Conduct characterization surveys Decontaminate structures as needed (not anticipated based on RLCR) Package decontamination waste Ship decontamination waste
Dismantlement	Disassemble, survey, and package electronics Ship electronics to PU&D Survey Building
Demolition	Demolish roof, walls, slab Sample soil

**Table 4-4. Building T886A**

Phase	Activity
Planning and Engineering	Perform Internal Management Review Develop Area- specific work plan Develop IWCP Work Package Develop Characterization Survey Develop Activity Hazards Analysis
Decontamination	Conduct characterization surveys Decontaminate structures as needed (not anticipated based on RLCR) Package decontamination waste Ship decontamination waste
Dismantlement	Disassemble, survey, and package electronics Ship electronics to PU&D Survey Building
Demolition	Disconnect and Ship Trailer off- site Sample soil

**Table 4-5. Buildings 888A and 888.**

Building	Phase	Activity
888A	Planning and Engineering	Perform Internal Management Review Develop Area- specific work plan Develop IWCP Work Package Develop Characterization Survey Develop Activity Hazards Analysis
888A	Decontamination	Conduct characterization surveys Decontaminate structures as needed (not anticipated based on RLCR) Package decontamination waste Ship decontamination waste
888A	Dismantlement	Disassemble, survey, and package electrical Ship electronics to PU&D Survey Room
888A	Demolition	Demolish roof, walls, and slab Sample soil
888	Planning and Engineering	Perform Internal Management Review Develop Area- specific work plan Develop IWCP Work Package Develop Characterization Survey Develop Activity Hazards Analysis
888	Decontamination	Conduct characterization surveys Decontaminate structures as needed (not anticipated based on RLCR) Package decontamination waste Ship decontamination waste
888	Dismantlement	Disassemble, survey, and package electrical Ship electronics to PU&D Survey Building
888	Demolition	Demolish roof, walls, and slab Sample soil

As indicated on Tables 4-1 through 4-5 management reviews to assess readiness will be conducted during the planning and engineering phase for each major activity. DOE and the LRA will receive notification concurrently. DOE will coordinate these reviews and the LRA will attend these assessments.

#### 4.1.1 Release Criteria

Release criteria for equipment and building materials for radionuclides as defined in 10 Code of Federal Regulations (CFR) 835, Occupational Radiation Protection will be used to guide the additional (i.e., post-deactivation) decontamination and decommissioning activities (Section 4.1.1.1). Release criteria for PCBs and lead and metals contaminated material and application in relation to decontamination and decommissioning are discussed in Sections 4.1.1.2 and 4.1.1.3.

**4.1.1.1 Radionuclides** - Table 4-6 summarizes the unrestricted release criteria for specific, residual, surface contamination levels expressed in terms disintegrations per minute (dpm) per 100 square centimeters (cm<sup>2</sup>). These criteria have been agreed to by CDPHE, the Lead Regulatory Agency, in lieu of other standards. These accepted industry standards for the release of materials are identified in "Radiation Protection of the Public and Environment", DOE Order 5400.5 as referenced in RFCA, Termination of Operating Licenses for Nuclear Reactors, Nuclear Regulatory Commission (NRC) Regulatory Guide 1.86 (NRC 1986), and the Health and Safety Practice Transfer and Unrestricted Release of Property and Waste, P73-HSP-1810 Appendix 1. All equipment or material not meeting the applicable unrestricted release criteria (Table 4-6) will either be decontaminated to the applicable standard or disposed as radioactive waste. The determination to dispose of real property includes an economic evaluation as identified in the Property Management Manual (1-MAN-009-PM), Chapter 5, "Economic Disposal Plan."

**Table 4-6. Summary of Unrestricted Release Activities (NRC 1986).**

Radionuclide	Average Total (Fixed + Removable) Contamination (dpm/100cm <sup>2</sup> )	Maximum Total (Fixed + Removable) Contamination (dpm/100cm <sup>2</sup> )	Removable Contamination (dpm/100cm <sup>2</sup> )
Transuranic; Ra-226, Ra-228, Th-228, Pa-231, Ac-227, I-125, I-129	100	300	20
Th-Natural; Th-232, Sr-90, Ra-223, Ra-224, U-232, I-131, I-133	1,000	3,000	200
U-Natural; U-235, U-238 and associated decay products, alpha emitters	5,000	15,000	1,000
Beta-gamma emitters (radionuclides with decay modes other than the alpha emission or spontaneous fission) except Sr-90 and others noted above.	5,000	15,000	1,000

**4.1.1.2 Polychlorinated biphenyls** - The sources of PCBs identified during reconnaissance level characterization are one gasket in Building 886 Room 111, fluorescent light ballasts, purple (light and dark) paint from HEUN lines, green paint with brownish/red base coat on electrical utility boxes, and potentially oil in the hydraulic pump for the horizontal split table in Building 886, Room 101. Human exposure to PCBs is regulated by OSHA to minimize worker exposure. With respect to waste generation, if materials >50 ppm PCBs are generated, these materials will be

managed as Toxic Substances Control Act (TSCA)-regulated. Any waste generated will be properly characterized and managed in accordance with the project-specific waste management plan, applicable laws and Site requirements.

**4.1.1.3 Lead and Metals** - Painted surfaces are the primary source of lead and/or metals contamination in the 886 Cluster facilities. Based on radiological evaluation, lead and metals paint-contaminated debris that is characterized as industrial waste will be transferred to either an approved low-level waste (LLW) treatment facility or a sanitary landfill. Waste streams that exceeds the toxicity characteristic thresholds listed in 40 CFR 261 and 6 Colorado Code of Regulations (CCR) 1007-3 Part 261 are not expected to be generated. Any waste generated will be properly characterized and managed in accordance with the project-specific waste management plan, applicable laws and Site requirements.

#### **4.1.2 Decontamination Options**

As shown by the activities outlined on Tables 4-1 through 4-5, the decontamination needs will be identified and refined for each area of the cluster. Decontamination options that were preliminarily considered for each area and associated technologies and general descriptions are illustrated in Figure 4-1. The technologies to be considered have been selected from the *DOE Decommissioning Handbook* (DOE 1994). The implementation of a specific technology or combination of technologies will be through IWCP Work Packages. Table 4-7 summarizes the decontamination options for each of the hazards identified in the RCLR, based on a screening of the options considered (Figure 4-1).

#### **4.1.3 Decommissioning**

Tables 4-1 through 4-5 summarize the activities associated with the decommissioning phases of the project. The following sections address general scope of decommissioning activities.

**4.1.3.1 Dismantlement** - Dismantlement encompasses eliminating the physical and electrical hazards associated with the facility in preparation for demolition. Equipment will be dismantled in place and packaged and surveyed for disposition, work areas will be de-energized, and pipes, pumps, tanks will be disassembled. Mechanical (e.g., wall and floor sawing, cutters) or thermal (e.g., flame cutting, arc cutting) dismantling techniques may be employed. All utilities and electrified system that are not necessary to maintain a safe working environment during dismantlement will be disconnected and capped. Cable and wiring of such systems will be removed. Piping systems in rooms or work areas disassembled.

**4.1.3.2 Demolition** - IM/IRA implementation will result in the removal and disposal of hazardous substances in accordance with the release criteria specified. A final survey will be performed in accordance with MARSSIM guidance as indicated in the IM/IRA, and a Final Survey Report will be prepared and submitted to the LRA. If the results of the final survey indicates the release levels were achieved, then no further documentation is required other than the Demolition Notification. If the LRA does not concur with the final survey results, the LRA will notify DOE and discuss their concerns. If concurrence cannot be reached or mutually acceptable contingency actions cannot be developed using the consultative process, the LRA may issue a Stop Work Order in accordance with RFCA. If the results of the final survey indicate release criteria have not been achieved, the LRA will be notified and contingency actions will be developed using the consultative process. Some examples of contingency actions include removing

***Figure 4-1. Decontamination Options and Technologies.***

**Table 4-7. Decontamination Approach.**

Option	Decontaminate?		Mechanical			Chemical	Innovative	
Technology			Cleaning	Surface Removal			Paint Removal	Isocyanate Fog
Description	Yes	No	Vacuuming/ sweeping/ wiping/scrubbing	Latex peelable coating	Scarifier/ scabbling	Milling/ paver breaker/ chipper hammer	Paint Removal	Isocyanate Fog
<b>Building 886</b>								
<b>Room 101</b>								
Radiological contamination - walls	.		.	.	.		.	.
Radiological contamination - floors	.		.	.	.		.	.
Radiological contamination - ceilings	.		.	.	.		.	.
Lead/metals in paint - walls		.(1)						
Lead/metals in paint - floors		.(1)						
PCBs - Purple paint from HEUN lines		.						
PCBs - Green paint on electrical boxes		.						
Rashig ring tanks	.		.	.				
SCRAM tanks	.		.	.				
Annular tank	.		.	.				
Piping	.		.	.				
Walk-in hood	.		.	.	.			
Horizontal spill table (Note: PCBs detected in hexane swipe from hydraulic pump for the horizontal spill table)	.		.	.				
Vertical spill table	.		.	.				
Solution base	.		.	.				
Elevated platform	.		.	.				
Concrete Reflector Pads (8)	.		.	.		.		
Hydraulic unit (1)	.		.	.				
Solution transfer pump and hold-up	.		.					
<b>Room 102</b>								
Radiological fixed contamination in floor	.			.	.			
Lead/metals in paint - walls		.(1)						



Table 4-7 (continued).

Option	Decontaminate?		Mechanical			Chemical	Innovative	
Technology	Cleaning		Surface Removal			Paint Removal	Isocyanate Fog	
Description	Yes	No	Vacuuming/ sweeping/ wiping/scrubbing	Latex peelable coating	Scarifier/ scabbling	Milling/ paver breaker/ chipper hammer	Paint Removal	Isocyanate Fog
<b>Room 103</b> Radiological CA -Fixed contamination – walls	•			•	•			
Radiological CA -Fixed contamination – floor Lead/metals in paint – walls PCBs – Purple paint from HEUN lines	•	•(1) •(1)		•	•			
PCBs – Green paint from electrical utility boxes Solution pumps (2)		•(1) •						
Piping and hold-up	•		•					
Stainless steel tanks	•		•					
Glovebox type enclosure (2)	•		•	•		•	•	
Hydraulic unit (2)	•		•	•				
<b>Room 108</b>								
Radiological CA -Fixed contamination – walls	•		•	•				
Radiological CA -Fixed contamination – floor	•			•	•	•		
Lead/metals in paint – walls PCBs – Green paint from electrical utility boxes		•(1) •(1)						
<b>Room 110</b> Lead/metals in paint – walls		•(1)						
<b>Room 111</b>								
Lead/metals in paint – walls		•(1)						
PCBs – Green paint from electrical utility boxes		•(1)						
PCBs – Gasket material from vibrator damper >50 parts per million (ppm)		•						

**Table 4-7 (continued).**

Option	Decontaminate?		Mechanical			Chemical	Innovative	
Technology	Cleaning		Surface Removal					
Description	Yes	No	Vacuuming/ sweeping/ wiping/scrubbing	Latex peelable coating	Scarifier/ scabbling	Milling/ paver breaker/ chipper hammer	Paint Removal	Isocyanate Fog
Ventilation ductwork Air compressor (2)	.							
<b>Room 112</b>								
Lead/metals in paint – walls		•(1)						
Lead/metals circuit boards		•(1)						
Reactor control console		•(1)						
<b>All other</b>								
Lead/metals in paint – walls One cylinder compressed nitrogen gas		•(1) .						
<b>Building 875</b>								
Radiological contamination filter plenum – walls	.	.	.			.	.	
Radiological contamination filter plenum – floors	.	.	.			.	.	
Radiological contamination filter plenum – ceiling	.	.	.			.	.	
Lead metals paint walls		•(1)						
Raschig ring tanks	.	.						
<b>Building 828</b> Pumps (electric motors) Raschig ring tank	.	.						
<b>Building 880</b> Radiological contamination from previously stored materials	.	.	.	.				

(1) Decontamination of these materials are not planned; however, if limited decontamination is deemed appropriate, any waste generated will be properly characterized and managed in accordance with the Site Specific Waste Management Plan, applicable laws and Site requirements

(i.e., cutting out) portions of walls, applying fixatives, and covering portions of the foundation. The contingency action or remedy will depend on the surface, demolition method, and level of contamination.

Demolition will remove the 886 Cluster facilities' aboveground structures and stabilize underground structures. These structures will likely be demolished using mechanical techniques accomplished using mobile demolition equipment. With the exception of the Building 886 slab, building foundations will be removed to grade and underground utilities will be capped at grade. Stabilization of the the tunnel and pit at Building 875 and Building 828 pit will be performed by backfilling these structures with clean fill or, if appropriate, building rubble. Equipment such as excavators equipped with a shear and/or a bucket, bucket loaders and dump trucks will be used. Salvageable material will be separated from the demolition rubble. Soils under building slabs, removed foundations and adjacent to and under subsurface structures may be contaminated. Demolition activities may expose these soils. Accordingly, soil will be sampled in cooperation with environmental restoration activities to assess the potential for contamination and ranking for RFETS Environmental Restoration priority. Sampling and Analysis Plans to characterize soils will be developed and included in the appropriate area-specific work plans. Results of the characterization will be compared to RFCA action levels (RFCA Attachment 5, Action Level Framework and Standards) and used in the Industrial Area IM/IRA.

## 4.2 Work Planning and Control

Enhanced Work Planning (EWP) is the natural implementing vehicle to involve workers, and to incorporate the five key elements of the Defense Nuclear Facility Safety Board recommendation 95-2. These key elements -- work scope reviewed and prioritized; work scope analyzed for hazards and categorized based on risk; controls established based on hazards, risk, and experience of workers; work performed safely, efficiently, with appropriate degree of supervision; and continuous improvement and lessons learned -- encompass the essence of an effective, efficient, and safety conscience work process. EWP also serves as a tool to implement the ISM process. The ISM process integrates safety into management and work practices at all levels.

As stated in Section 5, the ISM process will be implemented that is structured around five core principles (1) define the scope of work, (2) analyze hazards, (3) develop and implement controls, (4) perform work within controls, and (5) provide feedback and continuous improvement. The process will facilitate work by identifying key hazards up front and incorporating risk management into the job planning process. ISM combines a diverse group of people and risk graded infrastructure programs to satisfy the multiple safety environmental and health needs uniformly. In this process, lower risk activities would be considered Routine Work, with a basic IWCP Work Package, and no Activity Control Envelope (ACE) required for safe completion of the work. On the other end of the spectrum, more complex, high risk work would require the preparation of an ACE as well as some manner of demonstrating readiness for this activity. Routine work would encompass activities such as removal of lighting, elimination of furniture, cleaning of floors for RCRA closure, etc. High Risk work would encompass activities such as glovebox removal, strip-out of plenums, etc.

The detailed technical approach to decommission an area/room will be developed and approved in accordance with the IWCP process. The IWCP Work Package contains detailed instructions for performing work on site and contains specific controls and requirements to ensure protection of the workers, public, and environment. Given the tasks identified in the specific IWCP Work Packages and consistent with the ISM process and the HASP, the work supervision craft and industrial hygiene personnel will perform an AHA for the work tasks which have the potential to injure or damage personnel, property or the environment. This AHA will describe the hazards as well as the actions

necessary to eliminate or mitigate those hazards (i.e., training requirements, protective control measures and special equipment needed for specific job steps.)

## 5.0 HEALTH AND SAFETY

This section describes the work controls associated with the 886 Closure Project. As prescribed in DOE Order 440.1, Worker Protection Management for DOE Federal and Contractor Employees, the project must comply with the OSHA construction standards for Hazardous Waste Operations and Emergency Response, 29 CFR 1910.120 and 1926. Under these standards, a Building 886 Closure Project Specific HASP has been prepared to address the safety and health hazards of each phase of operations and specify the requirements and procedures for employee protection (RMRS et al., 1998). In addition, the DOE Order for Construction Project Safety and Health Management, 5480.9A, applies to this project. This order requires the preparation of AHAs to identify each task, the hazards associated with each task, and the precautions necessary to mitigate the hazards.

To comply with the health and safety standards specified, an Integrated Safety Management (ISM) process has been initiated and will be continuously implemented. The ISM process is illustrated in Figure 5-1 and structured around five core principles:

- (1) define the scope of work,
- (2) analyze hazards,
- (3) develop and implement controls,
- (4) perform work within controls, and
- (5) provide feedback and continuous improvement.

The objectives of the ISM and HASP are to:

- Protect the employees, co-located workers, the public and environment from hazards during decontamination and decommissioning.
- Ensure appropriate safety management is administered throughout decontamination and decommissioning.
- Develop and maintain a high level of health and safety awareness that is practiced by all levels of management, supervision, and employees.
- Meet the goal of zero lost time accidents for the entire decontamination and decommissioning process.
- Foster excellent safety communications between all Site work groups that are affected by the decontamination and decommissioning of the 886 Cluster to ensure the intent and goals of RFCA are met.
- Train project personnel so they are capable of completing assigned tasks safely and in compliance with the applicable environmental and safety regulations.

### 5.1 Preliminary Hazard Analysis

During the initial planning for the project, a Preliminary Hazard Analysis Overview (Tables 5.1 through 5.4) was produced to evaluate the potential health and safety hazard baseline for the project. This Preliminary Hazard Analysis includes an evaluation of the types of hazards associated with each phase of the project. The process will facilitate work by identifying preliminary key hazards up front (Tables 5.1 through 5.4) and incorporating risk

***Figure 5-1. ISM Process.***

**Table 5-1. Planning and Engineering Phase.**

Major Work Task	Hazard	Cause	Preventative Measures
Perform building walkdowns to identify IWCP work steps and engineering order requirements.	Tripping, falling, exposure to chemicals, hazardous substances and/or radioactive materials. Also, exposure to noise hazards.	No planning, lack of communicating between work groups, improper use of RWPs, not following room or building instructions.	<ul style="list-style-type: none"> <li>• Develop AHAs and IWCP Work Packages</li> <li>• Conduct effective pre-evolution briefings</li> <li>• Follow all building instructions</li> <li>• Ensure all personnel have been properly trained before entry</li> <li>• Adequate RWPs are developed and followed</li> </ul>
Move office equipment and furniture to prepare for D&D activities.	Back strains, pinch points, extremity injuries due to falling objects or moving vehicles.	Improper lifting of equipment, careless handling of equipment, improper planning and walkdowns. No continuing observations or use of the buddy system.	<ul style="list-style-type: none"> <li>• Proper training conducted and documented</li> <li>• Use of the buddy system</li> <li>• Proper use of forklifts and trucks including operating alarm systems and brakes</li> <li>• Planning meetings and briefings completed</li> <li>• Proper use of AHA and IWCP Work Package</li> <li>• Adequate RWPs are developed and followed</li> </ul>
Perform hazard analysis characterization activities. This includes asbestos, chemical, lead and radiological sampling.	Overexposure to substances, accidental inhalation of substances, absorption into skin of substances, eye and skin irritation. Exposure to radiological contamination.	Improper or no use of prescribed PPE, RWP lack of proper planning, not following sampling procedures correctly, improper transport or handling of samples.	<ul style="list-style-type: none"> <li>• Follow AHA and IWCP Package</li> <li>• Wear prescribed PPE properly</li> <li>• Conduct planning meetings and briefings</li> <li>• Follow RWP</li> <li>• Ensure all required training has been completed</li> </ul>

**Table 5-2. Decontamination Phase.**

Major Work Task	Hazard	Cause	Preventive Measures
Perform radiological decontamination operations.	Exposure to radioactive materials internally and externally. Cell damage and damage to internal body organs can occur with acute overexposure to radioactive materials. Improper use of scabbling or other decontamination equipment can injure extremity or other limbs of workers by causing gash or cutting wounds.	Improper clean up techniques including: Improper containment, decontamination or PPE usage. Improper ventilation usage. Improper waste disposal and handling. No or improper training in the proper use of decontamination equipment.	<ul style="list-style-type: none"> <li>• Ensure all workers are trained as Rad Worker II</li> <li>• Ensure all RFETS radiological prerequisites are met prior to job commencing</li> <li>• Develop and implement AHA(s) and IWCP Work Package for the job</li> <li>• Ensure all medical, equipment, training, and PPE req. are met</li> <li>• Ensure that proper radiological monitoring is performed</li> <li>• Follow the RWP instructions, including ALARA review if required</li> </ul>



**Table 5-3. Dismantlement Phase.**

Major Work Task	Hazard	Cause	Preventative Measures
De-energize work areas and remove cables and wiring.	Electrical shock to body, cutting of extremities or body parts using wire strippers or other hand tools, falling off ladder or scaffolding, if used. Exposure to radiological contamination.	LO/TO not used properly, all workers not informed of LO/TO status. Improper use of hand tools, ladders or scaffolding. Improper lighting in room can cause improper use of equipment as well. Improper or no use of RWPs	<ul style="list-style-type: none"> <li>• Utilize lockout and tagout procedures properly</li> <li>• Inspect all hand tools before use</li> <li>• Ensure all workers are trained in ladder, scaffolding and fall protection measures before using this equipment</li> <li>• Develop and utilize IWCP Work Packages and task specific AHAs</li> <li>• Perform work area walkdown and conduct proper planning meetings and briefings</li> <li>• Ensure all worker training is current</li> <li>• Adequate RWP developed and followed</li> </ul>
Move equipment out of rooms or area and transport utilizing forklifts, pallet jacks, or pick up trucks.	Back injuries, pinching, and extremity damage by dropping or falling objects. Internal and external body injuries by vehicle impact. Eye injuries by poking or dust particles in eye. Noise hazards. Exposure to radiological contamination.	Improper lifting techniques, job flow not planned properly, pre job walkdowns not performed, vehicle alarm systems not working, buddy system not used, lack of attention to detail, worker fatigue or no use or improper use of PPE. Improper or no use of RWP.	<ul style="list-style-type: none"> <li>• Perform pre job walkdowns</li> <li>• Develop AHAs for job</li> <li>• Use buddy system</li> <li>• Ensure vehicle alarm and braking systems are working properly</li> <li>• Utilize PPE properly</li> <li>• Perform proper lifting techniques</li> <li>• Perform pre job warm up exercises before lifting</li> <li>• Do not attempt to move items that are stacked too high</li> <li>• Cover all sharp edges with taping material</li> <li>• Adequate RWP developed and followed</li> </ul>
Cut out piping systems in rooms or work areas.	Cutting of body limbs or body parts with mechanical equipment. Piping falling on feet, pinch points of rolling pipe, liquid splashes if piping is not drained, springing of piping into body when cut. Exposure to radiological contamination.	Improper use of mechanical equipment including no training of equipment being used, piping not rigged or restrained properly, piping not drained prior to cutting. Improper or no use of RWP	<ul style="list-style-type: none"> <li>• Proper training with cutting equipment</li> <li>• Develop and utilize IWCP Work Packages and AHA for job tasks</li> <li>• Rig and restrain piping properly</li> <li>• Utilize pipe caps after cutting to keep debris from falling out and cover sharp edges of pipes after cutting</li> <li>• Ensure piping has been properly taken out of service</li> <li>• Utilize proper PPE as described in the AHA and RWP</li> <li>• Adequate RWP/ ALARA review developed and followed</li> <li>• Awareness of the possibility of encountering "hidden" contamination and adequate characterization to identify such contamination</li> </ul>

**Table 5-3 (continued).**

Major Work Task	Hazard	Cause	Preventative Measures
Rig piping and equipment out of rooms.	Bodily injuries due to falling objects or pinching of workers due to space limitations. Exposure to radiological contamination.	No rigging plan, improper rigging techniques, improper worker body positioning. Improper or no use of RWPs	<ul style="list-style-type: none"> <li>• Develop rigging plan</li> <li>• Comply with all RFETS standards for rigging</li> <li>• Develop AHA and implement</li> <li>• Perform pre job walkdown and conduct pre-evolution</li> <li>• Walkdown rigging path - all phases</li> <li>• Perform pre and post job inspections on all rigging equipment</li> <li>• Ensure all workers are properly trained</li> <li>• Adequate RWP developed and followed</li> </ul>
Packaging waste into containers for storage and shipment.	Pinching of extremities on container lids, barrels rolling on feet, back strains, foot injuries as vehicle wheels impactor roll onto extremities, cuts/gashes of hands by tooling. Exposure to radiological contamination.	Improper lifting and handling techniques, wrong tooling used to put lids on containers, pallet jack or forklift ramming into workers, job rushed or not planned properly. Improper or no use of RWPs	<ul style="list-style-type: none"> <li>• Develop AHA and implement</li> <li>• Review lessons learned from previous waste handling operations</li> <li>• Develop proper tool list before starting job</li> <li>• Ensure all waste containers are properly staged before starting job</li> <li>• Ensure all building notifications are made before moving and handling waste</li> <li>• Follow all RFETS requirements for waste handling and movement</li> <li>• Adequate RWP developed and followed</li> </ul>
Cut out and remove gloveboxes in rooms or work areas.	Pinch points, foot and hand injuries, cutting of hands/arms, eye and head injuries, burning of skin or extremities. Exposure to radiological contamination.	Improper use of grinders or no guards on grinders, cramped working conditions, bad lighting, limited vision, breaking of leaded glass, plasma slag burns through clothing, improper use of PPE. Improper or no use of RWPs	<ul style="list-style-type: none"> <li>• Proper training with cutting equipment</li> <li>• Develop and utilize AHA for job tasks</li> <li>• Rig and restrain gloveboxes properly</li> <li>• Utilize pipe caps on glovebox piping after cutting</li> <li>• Ensure gloveboxes have been properly taken out of service before work starts</li> <li>• Utilize proper PPE as described in the AHA</li> <li>• Perform tooling inspections before each use</li> <li>• Adequate RWP/ALARA review developed and followed</li> </ul>

**Table 5-3 (continued).**

Major Work Task	Hazard	Cause	Preventative Measures
Construct and utilize scaffolding to perform job tasks.	Fall hazards, workers struck by falling objects, hand injuries. Exposure to radiological contamination.	No use of fall protection, improper training, no use of PPE, improper use of tooling, improper rigging and transport of scaffolding pieces, no scaffold inspections, scaffold collapse. Improper or no use of RWPs	<ul style="list-style-type: none"> <li>• Proper training for scaffold erection and use</li> <li>• Fall protection and rigging training</li> <li>• Proper use of PPE</li> <li>• Develop AHA</li> <li>• Perform documented scaffolding inspections</li> <li>• Ensure all scaffolding is tagged properly</li> <li>• Ensure all toe boards and side rails are in place</li> <li>• Adequate RWP developed and followed</li> </ul>
Perform decontamination operations.	Extremity injuries of hand and feet by gouging, cutting or impact. Inhalation, ingestion or skin exposure to radioactive materials and ammonia vapors. Electrocution. Falls.	Improper or no training on equipment used for decontamination, improper work area ventilation, improper use of PPE, no job planning. No LO/TO of work area. No fall protection.	<ul style="list-style-type: none"> <li>• Conduct mock up training on decontamination equipment and stripcoat operations</li> <li>• Develop AHA for job tasks</li> <li>• Ensure work area is properly ventilated before applying stripcoat</li> <li>• Ensure LO/TO operations have been performed</li> <li>• Wear prescribed PPE as determined by IH&amp;S and Rad Protection</li> <li>• Utilize fall protection, when required</li> <li>• Follow all AHA and RWP requirements</li> <li>• Use appropriate engineering controls to reduce possible airborne contamination</li> </ul>
Perform final cleanup of building/structure.	Tripping, falls, head wounds, pinch points, punctures, contusions, skin contamination, inhalation, absorption of radioactive materials.	Housekeeping, falling objects, non use of PPE, improper use of PPE, sharp edges or sharp objects not protected, no fall protection, improper ladder use.	<ul style="list-style-type: none"> <li>• Perform weekly housekeeping inspections</li> <li>• Utilize fall protection, when applicable</li> <li>• Develop AHA for job task</li> <li>• Utilize PPE</li> <li>• Follow all ALARA reviews, AHAs, and RWP</li> </ul>

**Table 5-3 (continued).**

Major Work Task	Hazard	Cause	Preventative Measures
Perform final survey of building.	Falls, head wounds, electric shock, abrasions, cuts, pinches. Radiological contamination.	No fall protection, improper use of instrumentation, working in tight spaces, tripping hazards, bad housekeeping, improper termination of wiring. Prior operations exposing contaminated surfaces during decommissioning.	<ul style="list-style-type: none"> <li>• Develop AHA</li> <li>• Perform pre job walkdowns</li> <li>• Utilize fall protection, when required</li> <li>• Complete ladder training, as required</li> <li>• Utilize two person rule when working in elevated locations</li> <li>• Procure confined space permits and training, when required</li> <li>• Follow all AHA, RWP and Final Survey Plan requirements</li> <li>• Survey in accordance with approved site procedures</li> <li>• PPE per RWP</li> <li>• Train personnel</li> </ul>

**Table 5-4. Demolition Phase.**

Major Work Task	Hazard	Cause	Preventative Measures
Perform demolition activities of building/structure.	Body contusions, head injuries, suffocation, fatalities, breathing hazards.	Wetting of concrete surfaces not utilized, barriers not used properly, thorough inspections of work area not performed prior to demolition activities, lack of attention to detail.	<ul style="list-style-type: none"> <li>• Develop job AHA and IWCP Work Packages</li> <li>• Perform pre job walkdowns</li> <li>• Utilize PPE as prescribed by IH&amp;S</li> <li>• Maintain wetting of debris with fire hoses as demolition occurs</li> </ul>

management into the job planning process. The development and use of an AHA for specific activities developed during the planning and engineering phase of the project will be used to meet the need for continuously updated documentation of Preliminary Hazard Analysis baseline information.

All operations shall be conducted in accordance with the guidance of the HASP. The HASP will be revised as required by project operations and facility configuration changes at each step to ensure compliance. The Preliminary Hazard Analysis baseline information will be continuously updated and augmented using the AHA process.

## 5.2 Activity Hazard Analysis

The detailed technical approach to decommission an area/room will be developed and approved in accordance with the IWCP process. The IWCP Work Package contains detailed instructions for performing work on site and contains specific controls and requirements to ensure protection of the workers, public, and environment. Given the tasks identified in the specific IWCP Work Package and consistent with the ISM process and the HASP, the work supervision, craft and industrial hygiene personnel will conduct an EWP session to evaluate all work tasks for the potential to injure or damage personnel, property or the environment. This AHA will describe the hazards as well as the actions necessary to eliminate or mitigate those hazards (i.e., training requirements, protective control measures, monitoring requirements and special equipment needed for specific job steps.)

## 5.3 Monitoring

Occupational monitoring requirements for individual work tasks will be identified during the EWP session and documented in the AHA. Typical monitoring activities are summarized on Table 5-5.

### 5.3.1 Chemical Hazard Monitoring

Per the HASP, the need for chemical hazard monitoring will be determined by the Project Safety Officer or designee. All air sampling and monitoring will be performed in accordance with approved National Institute of Occupational Safety and Health or OSHA sampling methods using either direct reading instrumentation or personal air sampling as directed by the IH&S lead or designee. All instrumentation used will be calibrated in accordance with factory recommendations.

**Comment:** Monitoring for this section should be broken-out as to whether it is for environmental or occupational in nature. I can provide you with the occupational hazards in tabular form but I am unsure as to the requirements for environmental. What documents that we have regarding site air and water quality will specify monitoring requirements. Also we may have to develop additional controls based upon regulation if these are not specified in a permit.

**Table 5-5. Typical Monitoring Activities.**

Hazard	Exposure Control Limit	Monitoring Method	Frequency of Monitoring
Exposure to hazardous substances such as lead, asbestos or any other material(s) identified that are respirable.	Permissible Exposure Limits (PEL's) are based on 8 hour Time Weighted Average (TWA) exposure and Short Term Exposure Limits (STEL's) set forth by the Occupational Safety and Health Administration (OSHA) or the American Conference of Governmental Industrial Hygienists (ACGIH), whichever is more conservative	Many hazardous substances are monitored using a personal air sampling pump such as a Gilair or SKC to obtain a continuous sample of the most at-risk worker's breathing zone. The sample media, sampling technique and analysis method are unique to the substance being monitored and are specified by OSHA or the National Institute for Occupational Safety and Health (NIOSH).	Continuously during work; short term samples as required to document STEL's.  Continuous area monitoring and clearance sampling as required.
Silica dust	0.05 mg/m <sup>3</sup>	Aerosol monitor such as an MIE PDM-3.	As required by the AHA.
Heat stress	The need to regulate periods of work and rest are determined using worker dress-out, work activity and thermal environment.	Monitor the thermal environment with a wet bulb temperature monitoring device such as the WBGT. Worker condition can be checked using body temperature, pulse and visual assessment.	Varies by conditions and work task
Noise	85 dB continuous for an 8hr exposure period; expressed as a Threshold Limiting Value (TLV)	Monitor work environment using a sound level monitor. Use noise dosimeters on highest risk workers.	Daily and as required during tasks by the AHA or conditions.

### 5.3.2 Radiological Hazard Monitoring

Per the HASP, air monitoring within the work areas will be performed using portable Continuous Air Monitors (CAMs), high volume and low volume air sampling. The use of portable CAMs allows the project flexibility in monitoring locations, resulting in more effective monitoring. Training on the use and response of these monitors will be provided to all project personnel. Personnel monitoring for radiological hazards will be identified in RWPs and the ALARA job reviews. All radiological monitoring will be performed in accordance with the procedures contained in the RFETS HSP Manual, RFETS Radiological Control Manual, and the Radiological Safety Procedures (RSPs).

The requirements for monitoring radiological hazards from the RFETS Radcon Manual are individualized to a particular work task and are documented in the RWP. Typical monitoring for radiological hazards will include:

- Airborne - Monitored using high or low volume sampling pumps. Sample media is typically glass fiber filter and must be counted for alpha and/or beta-gamma activity to determine the exposure. Exposure is measured in Derived Air Concentrations (DAC's) and is dependent upon the particular radionuclide(s) present (e.g., Pu239 DAC is  $2E-12$  microCuries per milliliter [ $\mu\text{Ci/ml}$ ]). The frequency of monitoring is dependent upon the work task and contamination levels and is specified in the RWP.
- Contamination - Monitored by smear sample and/or direct measurement with a frisking instrument such as a Bicon Frisktech. Limits for contamination are listed in the RFETS Radiological Control Manual and are dependent upon the particular radionuclide present and are expressed in units of dpm/100 cm<sup>2</sup>. Frequency of monitoring will include routine surveys (shiftly, daily, etc.), as required by the RWP and at the discretion of Radiological Controls personnel.
- Radiation - Radiation surveys are performed using instrumentation that is capable of detecting the type and energy of emitted energy present and is expressed in units of mrem/hr. These exposure rates are used to determine personnel exposure estimates, provide data to ensure that all exposure is As Low As Reasonably Achievable (ALARA), and to properly control areas of potential exposure to personnel. Personnel exposure is monitored using Thermal Luminescent Dosimeters (TLDs) and the results become permanent exposure records. Frequency of monitoring will include routine surveys, as required by the RWP and at the discretion of the Radiological Controls personnel.

### 5.3.4 Industrial Area Monitoring

The IA IM/IRA is a decision document designed to ensure that environmental monitoring is sufficient to detect potential releases to the environment during transition activities such as those actions conducted under this IM/IRA. The objective of the IA IM/IRA is to define a program that proactively addresses monitoring requirements for the RFETS IA. The IA IM/IRA (DOE, 1994) provides a methodology for establishing a baseline environmental data set; warning limits and controls; evaluating potential monitoring technologies; outlining the pre-programmed responses during verification monitoring; and summarizing the current emergency response procedures. The requirements of the IA IM/IRA are applicable to the decommissioning of the 886 Cluster and must be addressed. Prior to demolition of the facility, an evaluation will be made to determine if additional monitoring of air and water is required for the period of demolition and after closure.

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### 5.3.5 Air Monitoring

The K-H Air Quality Management (AQM) organization provides monitoring support for RFETS. The existing Radioactive Ambient Air Monitoring Program (RAAMP) continuously monitors for potential airborne dispersion of radioactive materials from the site to the surrounding environment. Thirty-one samplers compose the RAAMP network. Twelve of these samplers are deployed at the site perimeter and are commonly used to measure potential off-site impact. The others are used should there be a need to assess local (i.e., on-site) impacts. During demolition activities, on-Site samplers located near the demolition area will be used to characterize the contaminants that may have become airborne due to the demolition activities. Samples will be collected weekly and will be screened to identify any periods that may have yielded higher than expected emissions. The screening analysis will allow quicker feedback to project staff than is possible when the samples are subjected only to the more time-intensive routine isotopic analysis.



## 6.0 WASTE MANAGEMENT

The *886 Cluster Closure Project WMP* (RMRS, 1998) follows DOE guidance and is intended to augment this IM/IRA Plan. The waste generated by the project will be managed by properly trained personnel in accordance with state and federal regulations. The RFETS Waste Operations organization will arrange interim storage of the wastes generated and for transportation to an appropriate off-site facility (Table 6-1). Manifests will be the responsibility of RFETS Traffic Department. Waste management training requirements are outlined in Part IX Personnel Training of the RFETS RCRA Permit (DOE 1997a). The training matrix defined in Part IX details the training requirements for all personnel managing hazardous and low level waste.

The overall strategy for managing waste resulting from the decontamination and decommissioning of the 886 Cluster is to evaluate the generation and waste management on an area-specific basis. In general, waste materials will be sorted at the time of removal and prepared for further decontamination, survey, recycle, processing and packaging in another area of the 886 Cluster, away from the point of generation, and likely in Building 880. The existing RFETS Waste Management Program and procedures will be used as guidance to ensure the waste has been generated, packaged, and surveyed to meet the final disposal facility's Waste Acceptance Criteria (WAC).

Waste types which will result from the decontamination and decommissioning of the 886 Cluster include radioactive, mixed, hazardous, toxic, and sanitary (i.e., industrial) waste. Preliminary estimates of waste type and volume, as provided in the RLCR, are shown in Table 6-1 (RMRS 1997a). These estimates will be refined, on an area-specific basis, in the area-specific work plans. All waste generated as a result of decontamination and decommissioning activities will be managed in accordance with relevant RFETS waste operations procedures as guidance. Applicable federal, state, local, and DOE requirements have been incorporated into the RFETS waste operations procedures. The 886 WMP provides the detail associated with characterization, storage, disposal, and overall waste management for the 886 Cluster. Area-specific considerations with respect to waste management will be included in the area-specific work plans developed for the project.

**Table 6-1. Preliminary Estimates of Waste, Interim Storage, and Proposed Final Disposition for the 886 Cluster Project.**

Type of Waste	Primary Matrix	Quantity (cubic feet)	Type of Waste Package	Quantity of Waste Package	Interim Storage	Final Disposition
Low -level	Benelex and Plexiglass	224	Full Wooden Crate	2	664	NTS
Low -level	Dry Combustibles	453	55-gallon drums; Full Wooden Crates	33	554	NTS
Low -level	Wet Combustibles	389	55-gallon drums; Half Wooden Crate	46	664	NTS
Low -level	Plastics	790	55-gallon drums; Full Wooden Crates	22	664	NTS
Low -level	Leaded gloves	7	55-gallon drums	1	664	NTS
Low -level	Concrete	1,680	Full Wooden Crate	15	664	NTS
Low -level	Unleached Raschig Rings	1,258	30/55-gallon drums	170	664	NTS
Low -level	Light Metal	6,660	Full/Half Wooden Crate; 55-gallon drums	66	664	NTS
Low -level	HEPA Filters	791	55-gallon drums; Full Wooden Crates	8	664	NTS
Low -level	HEPA Filters	112	Full Wooden Crates	1	440	NTS
Low -level	Absorption Rods	56	Half Wooden Crates	1	664	NTS
Low -level	Non-leaking ballasts	7.4	55-gallon drums	1	666	Envirocare
Low -level	Boroflex Shielding	56	Half Wooden Crates	1	664	NTS
Low -level	Hydraulic Fluid	2	Gallon containers	2	To-be-determined (TBD) <sup>1</sup>	TBD <sup>1</sup>
TSCA Low-level	Light Metal	439	Half Wooden Crates	6	666 <sup>1</sup>	TBD
Hazardous	Lead	1	10-gallon drum	1	Recycle <sup>2</sup>	Recycle <sup>2</sup>
Hazardous	Spent Fluorescent Light Bulbs	TBD	Manufacture Boxes	TBD	TBD	TBD
TSCA	Gasket	<1	Bagged	N/A	TBD <sup>3</sup>	TBD <sup>3</sup>
Sanitary	Rubble	50,000	Bulk	N/A	TBD <sup>4</sup>	TBD <sup>4</sup>

1 Suspect PCBs; in-process sampling

2 Recyclable lead includes lead bricks and shielding

3 Non-radioactive TSCA waste will be disposed with in-process, non-radioactive TSCA waste

4 Volume for Building 886; remaining cluster facilities TBD

## **6.1 Waste Types**

### **6.1.1 Low-level Waste**

LLW is defined as radioactive waste that is not classified as TRU waste, spent nuclear fuel, or by-product material as identified in DOE Order 5820.2A, Radioactive Waste Management. LLW contains less than 100 nanoCuries per gram (nCi/g) TRU radioactivity. Based on economical and technical constraints, items will be decontaminated to unrestricted release conditions whenever possible (Table 4-1). Items that have been decontaminated to an unrestricted release condition will be transferred for use at a different location within RFETS, for use at a different DOE facility, or sent to the Property Utilization and Disposal (PU&D) organization for appropriate disposition. Only materials that meet recycle/reuse criteria identified in the Property Management Manual will be sent to PU&D. As appropriate, low-level and low-level mixed waste will be generated, characterized, and packaged in accordance with the RFETS Low-Level Waste Management Plan.

### **6.1.2 Mixed Waste**

Mixed waste means waste that contains both hazardous waste and source, special nuclear, or by-product material subject to the Atomic Energy Act of 1954 (42 U.S.C. 6903(41)). Mixed waste is characterized as either low-level or TRU based on the amount of radioactivity at the time of assay. Mixed waste is not anticipated to be generated from decontamination and decommissioning activities. It is anticipated that only low-level will be generated from the action. If mixed waste is encountered, this waste will be stored in temporary units (TUs) prior to shipment to an approved, off Site disposal facility.

### **6.1.3 Hazardous Waste**

Hazardous waste is defined as waste that is listed or exhibits the characteristics of corrosivity, ignitability, reactivity, toxicity or that is listed in 6 CCR 1007-3, Part 261, or 40 CFR 261, Subpart D. It is anticipated that lead and metals contaminated material such as painted surfaces will be generated from the IM/IRA. However, based on the results of previous toxicity characteristic leaching procedure tests conducted on similar material, the metals in the paint remain fixed to the surface to which they are applied. As a result, when disposed in bulk, these materials are considered non-hazardous.

### **6.1.4 Toxic Substances Control Act Waste**

TSCA addresses all chemical substances manufactured or processed in or for the United States. A chemical substance is defined in broad terms as any organic or inorganic substance of a particular identity including those substances identified in 15 CFR, Paragraph 2602(2)(A)(i-vi) and which may present unreasonable risk or injury to health and the environment. Of particular significance to the 886 Cluster are PCBs as regulated under 40 CFR 761. With the exception of the potential for PCBs in light ballasts, the PCB-containing materials identified in the cluster are a gasket in Building 886, Room 111, purple (light and dark) paint from HEUN lines, green paint with brownish/red base coat on electrical utility boxes, and potentially oil in the hydraulic pump for the horizontal split table in Building 886, Room 101. Waste generated from decontamination and decommissioning of these materials will be handled as TSCA waste. With respect to the light ballasts, light ballasts marked "No PCBs" or "PCB free" will be managed as solid waste and disposed at a sanitary landfill. Ballasts marked "PCBs" or not marked and not leaking will be transferred to a regulated storage facility within 24 hours and subsequently packaged for disposal at a TSCA-

permitted facility. Leaking PCB light ballasts and unmarked light ballasts will be managed as fully-regulated PCB articles.

#### **6.1.5 Sanitary Waste**

Sanitary waste is characterized as that waste which meets RCRA Subtitle D requirements. Industrial waste will be generated as a result of the 886 Cluster. This waste will be managed in accordance with Colorado rules and regulations.

### **6.2 Waste Minimization**

Waste minimization will be integrated into the planning and management of the 886 Cluster decontamination and decommissioning wastes. Project management and staff will incorporate waste minimization practices into work procedures. Minimizing generation of radioactive and mixed waste will be controlled by using work techniques that prevent the unnecessary contamination of areas and equipment, preventing unnecessary packaging, tools, and equipment when practical. Waste minimization will be accomplished using a waste life cycle cost approach. If the cost to demonstrate that the item is not contaminated exceeds the cost for waste disposal, the item will be disposed of as waste in accordance with the Property Management Manual, 1-MAN-009-PMM. The evaluation may include disassembly, decontamination, and survey costs. Elimination and reduction of waste generated as a result of decontamination and decommissioning is high priority. Decontamination options will be evaluated for waste minimization potential and suitable minimization techniques will be implemented. Most of the bulk building structural material is expected to be free released and will be removed from the Site for recycle or disposal as appropriate.

### **6.3 Waste Characterization**

The overall approach to waste characterization is described in the *886 Cluster Closure Project WMP* (RMRS, 1998). Data collected in support of the reconnaissance level characterization and in-process characterization will be used to estimate the type and volume of waste to be generated. Preliminary waste volume estimates are provided in Table 5-1. The area-specific work plans will include volume estimates applicable to the corresponding area.

### **6.4 RCRA Units**

There are no RCRA units located in the 886 Cluster facilities. The project will not establish any RCRA permitted waste storage units within the 886 Cluster. Remediation waste, if generated, will be managed in accordance with waste container management requirements (See Section 7.2.2.1).

### **6.5 Idle Equipment and Chemical Compliance**

Presently, hazardous materials contained in idle equipment are processed by building operations personnel in compliance with the Management Plan for Material Contained in Idle Equipment, 94-MP/IE-0017. Hazardous materials contained in idle equipment in the 886 Cluster have been identified for dispositioning during deactivation. Remaining idle equipment will be managed in accordance with the Idle Equipment Consent Order (Docket Number 97-08-21-01) during decontamination and decommissioning and residual wastes will be considered remediation wastes. These items are included, on a building specific basis, in Tables 2-1 through 2-6.

The roundup of chemical pursuant to the Chemical Consent Order (97-08-21-02) will be completed prior to implementation of this IM/IRA. Chemicals previously excluded or newly discovered chemicals during decommissioning activities will be considered remediation waste.

## 6.6 Off-Site Transfer of Wastes and Applicability

Remediation wastes are not exempt from the Land Disposal Restriction (LDR) standards (40 CFR 268) when they are transferred off-site for disposal. As a result these wastes must meet all applicable LDR standards when transferred off-Site for disposal.

In addition, the facility accepting CERCLA wastes must meet the requirements of the final Off-Site Rule (58 CFR 49200). The primary purpose of the Off-Site Rule is to clarify CERCLA's requirement to prevent wastes generated from remediation activities conducted under CERCLA from contributing to present or future environmental problems at off-Site waste management facilities. Only facilities that meet Environmental Protection Agency's (EPA) criteria can be used for off-Site management of CERCLA wastes. The Off-Site Rule applies to both hazardous and non-hazardous wastes generated from CERCLA remedial and removal actions funded.

Release of non-contaminated material, debris, and equipment from a site contaminated with hazardous materials is accomplished by:

- demonstrating the materials or waste do not exhibit any of the characteristics of hazardous waste, and are not listed hazardous waste, as identified in Subpart C of 6 CCR 1007-3 Part 261 or are excluded under the provision in 40 CFR 268, Subpart D, and
- the off-site waste management facility meets the requirements of the CERCLA Off-Site Rule.

Process knowledge and operating history related to the facilities can also be used to segregate hazardous contaminant areas from unaffected areas. Further sampling and analysis of wastes may be required during the project to determine if the wastes are regulated as LDR, or if the wastes can be exempted under the hazardous debris rule. LDR requirements are integrated into RFETS waste and characterization procedures to ensure compliance with designated TSD facilities and on-Site WAC.

The transfer of hazardous and/or mixed hazardous waste from the Site to an off-Site waste management facility is accomplished by:

- identifying and meeting all applicable LDR standards;
- meeting all DOT requirements
- ensuring that the off-Site waste management facility meets the requirements of the CERCLA Off-Site Rule;
- using approved waste management vendors; and,
- meeting the receiving facility's WAC.

Under the "hazardous debris rule" provision (40 CFR 268.45), and in accordance with the debris treatment standards defined in 6 CCR 1007-3 Section 268.45, treated hazardous debris is exempted from the definition of hazardous waste, provided that the debris is treated to the performance or design and operation standards by an extraction or destruction technology, and the treated debris does not exhibit the characteristics of a hazardous waste. The exempted debris (i.e., that meeting the release criteria specified in Section 4.1.1) can be disposed in an industrial

landfill (6 CCR 1007-3, Section 268, Subpart D) rather than a RCRA permitted landfill (6 CCR 1007-3, Section 268, Subtitle C). Note that these exemptions apply to disposal of certain low-level mixed wastes if they meet the receiving Site's WAC for hazardous debris.

## 7.0 COMPLIANCE WITH ARARs

As noted in Section 1.1, decontamination and decommissioning actions at RFETS must attain, to the maximum extent practicable, compliance with the substantive aspects of the federal and state ARARs. The ARARs relating to this proposed action are identified in this section and summarized in Table 7-1. In addition, Table 7-1 identifies whether the requirement is applicable or relevant, and appropriate, or To-Be-Considered (TBC). Pursuant to RFCA ¶16, the procedural requirements to obtain federal, state, or local permits are waived as long as the substantive requirements that would have been imposed in the permit process are identified and explained (RFCA ¶17). The following discussion is intended to compliment other descriptions provided in the IM/IRA Plan in a manner that satisfies the RFCA permit waiver requirements.

**Table 7-1. ARARs.**

Action	Requirement	Prerequisite	Citation	ARAR
Air Quality	Compliance with air emissions	Control of emissions for smoke, particulate, and volatiles of concern. Implemented for construction activities, haul roads, haul trucks, demolition activities.	5 CCR 1001-3, Regulation 1  5 CCR 1001-9 Regulation 7	Applicable
	Compliance with NESHAP	Regulates radionuclide emissions from DOE facilities with a limit of 10 millirem per year (mrem/yr) Site standard.	40 CFR 61 Subpart H  5 CCR 1001-10 Regulation 8	Applicable
	Compliance with NAAQS	Maintain quality of ambient air for criteria pollutants.	5 CCR 1001-14	Applicable
	Compliance with Hazardous Air Pollutant Requirements	Implemented if the remedial action involves a specific, regulated pollutant.	5 CCR 1001-10 Regulation 8	Applicable
Solid Waste	Compliance with ozone depleting compound requirements	Ensure refrigerants are disposed of properly. Approved vessel recovery method must be used.	5 CCR 1001-19 Regulation 15	Applicable
	Solid Waste Disposal Act	Requirements for disposal of solid wastes.	6 CCR 1007-2	Applicable
TSCA	Disposal of PCBs	Ensure that any materials with >50 ppm PCBs are managed according to TSCA.	40 CFR Part 761	Applicable
Hazardous Waste	Compliance with Colorado Hazardous Waste Act	Identification and characterization of hazardous waste.	40 CFR 261  6 CCR 1007-3 Part 261	Applicable

**Table 7-1 (continued).**

Generator Standards	Standards Applicable to Generators of Hazardous Waste	Generator prepares a manifest if hazardous remediation wastes are disposed of off-Site.	40 CFR 262 6 CCR 1007-3 Part 262	Applicable
TSD Facility Standards	Temporary Unit Container and Tank Storage Requirements	Requirements for operation of temporary tank and container storage areas.	40 CFR 264.553 6 CCR 1007-3, Part 264.553	Applicable
Closure	Requirements for Closure of Permitted RCRA Units	Implemented if RCRA permitted units are closed.	40 CFR 264 6 CCR 1007-3, Part 264	Applicable
Closure	Requirements for Closure of RCRA Interim Status Units	Implemented if RCRA Interim Status Units are closed.	40 CFR 265 6 CCR 1007-3, Part 265 as provided in RFCA Attachment 10	Applicable
LDR	Treatment standards for hazardous waste	Requirements for treatment and land disposal of hazardous wastes.	40 CFR 268 6 CCR 1007-3, Part 268	Applicable
Universal Waste Management	Requirements for Universal Waste Management	Requirements for treatment and land disposal of hazardous waste.	40 CFR 273	Applicable
Used Oil Management	Requirements for Used Oil Management	Implemented if used oil is managed.	40 CFR 279	Applicable
Water	NPDES Requirements for discharging waste into surface water bodies	Requirements for discharge of stormwater or treated wastewater into surface water bodies.	40 CFR Parts 122 and 125 5 CCR 1002-8	Applicable
LLW Disposal	LLW Disposal	Requirements governing off-Site disposal of LLW.	DOE Order 5820.2A 10 CFR 61	TBC
Radiation Protection	Standards for radiation protection	Establishes the criteria for the protection of human health and the environment.	DOE Order 5400.5	TBC
Radioactive Waste Management	Radioactive Waste Management	Requirements for the management and packaging of LLW.	DOE Order 5820.2A	TBC

## 7.1 Chemical-specific Requirements and Considerations

The project will encounter conditions regulated by the following chemical-specific restrictions. The restrictions will be incorporated into the project planning effort and will be assured by following site procedures or by direct inclusion in an IWCP Work Packages.

Decommissioning has the potential to generate criteria, radionuclide, and Hazardous Air Pollutant emissions.



The following Colorado Air Quality Control Commission Regulations serve as chemical specific applicable requirements:

- 5 CCR 1001-10, Regulation No. 8, Part A (40 CFR Part 61) Subpart H regulates radionuclide emissions other than radon from DOE facilities and will apply to the radiologically-contaminated portions of the 886 Cluster during decontamination and decommissioning. Section 61.92 establishes a Site radionuclide emission standard of 10 mrem/yr effective dose equivalent (EDE) to any member of the public. Section 61.93 mandates continuous radionuclide air emission monitoring for all points that have an estimated potential EDE to any member of the public of greater than 0.1 mrem/yr, based on uncontrolled emissions. Section 61.96(b) requires that an application for approval and notification of start-up be filed with EPA and CDPHE for any new or modified source of radionuclide emissions if estimated controlled emissions from the source would cause any member of the public to receive an EDE of 0.1 mrem/yr or greater. Preliminary estimates of the EDE resulting from controlled and uncontrolled emissions of radionuclides indicate that neither regulatory approval nor continuous radionuclide air monitoring will be required for the Building 886 decommissioning and demolition project. Radionuclide emissions from the project will be included in the Site radionuclide annual report.
- Regulation 8, Part C establishes an emission standard for lead in ambient air. The regulation states that no person shall cause or permit emissions of lead into the ambient air that would result in an ambient lead concentration exceeding 1.5 µg/m<sup>3</sup> averages over a one-month period. The regulation will apply to any decontamination or decommissioning activities with the potential to emit lead into the ambient air. Based on past experience with similar projects, the proposed activities are not likely to produce significant lead emissions that could exceed the ambient standard.

## 7.2 Action-specific Requirements and Considerations

### 7.2.1 Air

Decommissioning has the potential to generate particulate and fugitive dust emissions. 5 CCR 1001-3, Regulation No. 1, governs the opacity and particulate emissions. Regulation No. 1, Section II, addresses opacity and requires that stack emissions from fuel-fired equipment must not exceed 20 % opacity. Regulation No. 1, Section III addresses the control of particulate emissions. Fugitive particulate emissions will be generated from demolition, transport, and backfilling activities. Control methods for fugitive particulate emission will be addressed through the integrated monitoring program and should be practical, economically reasonable, and technologically feasible. During demolition activities dust minimization techniques such as water sprays, will be used to minimize suspension of particulates. In addition, demolition operations will not be conducted during periods of high wind. The substantive requirements will be incorporated into the area-specific work plans which will define the level of air monitoring and particulate control for the project.

5 CCR 1001-3, Regulation No. 3, provides authority to CDPHE to inventory emissions. Regulation No. 3, Part A, describes Air Pollutant Emission Notice (APEN) requirements. If applicable, RFETS will prepare an APEN to facilitate the CDPHE inventory process.

### 7.2.2 RCRA/CHWA/NPDES

**7.2.2.1 Waste Storage** - The waste generated during the decontamination and decommissioning activities governed by this IM/IRA are remediation wastes (See RFCA ¶25bf and RFCA Appendix 3, the Implementation Guidance Document). Remediation waste generated during this removal action will be evaluated consistent with the requirements of RCRA Part 261, Identification and Listing of Hazardous Waste, specifically Subparts A through C. Solid remediation waste will be generated and managed in accordance with the Colorado Solid Waste Disposal requirements, 6 CCR 1007-2. In addition, sections of Part 268, LDRs applicable to off-site shipment and disposal of hazardous waste are ARAR.

If necessary, remediation waste will be temporarily managed in a configuration which meets the substantive requirements of section 264.533 for management of TUs. The requirements governing TUs are applicable to tanks and containers used for storage and treatment of hazardous remediation wastes generated in conjunction with the decontamination and decommissioning activities (See 40 CFR 264.553). All tanks and containers will be compatible with the waste and in good condition. Incompatible wastes, if encountered, will be segregated within the units. Secondary containment will be provided, as appropriate, if liquid wastes are stored or treated in tanks or containers. Waste characterization will be provided, as appropriate, in accordance with the WMP. Inspections, at a minimum of once a week, will be provided during operations in accordance with the WMP. Training for individuals generating and handling waste will be implemented using the framework identified in the RFETS Part B permit. To close a TU, waste and contaminated soils will be removed, as appropriate. The information in this paragraph is provided to satisfy the permit waiver conditions in RFCA ¶17.

**7.2.2.2 Waste treatment** - Any waste, soil/waste mixture, debris, liquid, or remediation waste that is identified as a hazardous waste requires treatment to the LDR treatment levels for wastewater or non-wastewaters, as appropriate, prior to disposal. (See 40 CFR 268.40, Treatment Standards for Hazardous Wastes) prior to disposal. Solidification of characteristic hazardous remediation wastes may be conducted within a TU. For example, scabbling of low level, RCRA characteristic lead-based paint may result in a remediation waste form amenable to solidification. The solidification would be conducted within competent tanks or containers and subject to waste analysis requirements imposed by the WMP. The information in this paragraph is provided to satisfy the permit waiver conditions in RFCA ¶17.

**7.2.2.3 Debris treatment** - Where appropriate, the project decontamination pad or the sitewide decontamination facility will be configured to perform low-level, hazardous, or mixed waste debris treatment in accordance with 40 CFR 262.34, 268.7(a)(4) and 268.45. The information in this paragraph is provided to satisfy the permit waiver conditions in RFCA ¶17.

Solid residues from the treatment of debris containing listed hazardous wastes are subject to RCRA hazardous waste management ARARs as are any solid residues from debris treatment that exhibit a hazardous waste characteristic.

Liquid residues from the treatment of debris containing listed hazardous wastes are subject to RCRA hazardous waste management ARARs until they are placed into the Consolidated Water Treatment Facility (CWTF) headworks. Any building residues that result from the treatment of listed debris will carry the same listing as the listed debris from which it originates. Any CWTF treatment residues that exhibit a hazardous waste characteristic will also be managed in accordance with RCRA hazardous waste management ARARs. Alternatively, liquid residues that meet acceptance criteria may also be treated in Building 374 or the sewage treatment plant in compliance with the RCRA and National Pollutant Discharge Elimination System (NPDES) permits.

**7.2.2.4 Wastewater treatment** - Remediation wastewaters generated during decontamination and decommissioning will be transferred to the CWTF (Building 891) for treatment. Remediation wastewaters that contain listed RCRA hazardous wastes or exhibit a RCRA characteristic will not be subject to compliance with RCRA ARARs while being stored in the CWTF headworks or during treatment because the wastewaters are CERCLA remediation wastes being treated in a CERCLA treatment unit. The CWTF will treat the remediation wastewaters to meet applicable surface water quality standards under a NPDES ARARs framework. Waste generated at the CWTF will also be evaluated for hazardous characteristics. The information in this paragraph is being provided to satisfy the permit waiver conditions in RFCA ¶17.

**7.2.2.5 Inert material** – Building rubble which meets the unrestricted release criteria may be used to backfill and stabilize underground structures. Concrete, brick, or cinder block are within the definition of “inert material” under the Colorado Solid Waste Disposal Sites and Facilities Regulations (6 CCR 1007-2, Part 1, Section 1.2). This definition is applicable to building rubble that will be used as backfill. Section 4 of the Solid Waste Disposal Sites and Facilities Regulations is entitled “Construction Debris and Inert Material Landfill Sites and Facilities”. At this time, the section is reserved and no specific substantive requirements for inert material have been promulgated. The CDPHE statewide policy requires inert material facilities to satisfy, relevant standards found in 6 CCR 1007-2, Part 1, Section 2. The following requirements are relevant and appropriate for disposal of inert material in the tunnel:

- meet air, water quality and groundwater ARARs (see §2.1.1, §2.1.4, §2.1.5 and §2.1.15)
- prevent disposal of hazardous waste, PCB waste, waste water treatment sludge or liquids (§2.1.2, §2.1.12, and §2.1.14)
- prevent nuisance conditions (§2.1.3)
- control stormwater run-on (§2.1.6)
- control access (§2.1.8)
- provide adequate final cover to prevent ponding, wind erosion and water pollution (§2.1.10)
- prevent windborn debris movement (§2.1.11)

At closure, the inert material disposal facility must:

- be left in an orderly condition with good aesthetic appearance (§2.1.16)
- provide groundwater monitoring, as appropriate, in accordance with the RFETS Integrated Monitoring Plan (§2.2.1).
- attain ARARs (especially surface water requirements) on a long term basis (§2.5.5)
- prevent nuisance conditions beyond the boundary after closure (§2.5.6)

Requirements of §2.1.1, §2.1.4, §2.1.5 and §2.1.15 are addressed in the IM/IRA. Section 7.2.1 describes the ARARs for air and the measures to ensure compliance for the 886 Cluster decommissioning project. These activities encompass fugitive particulate emissions from demolition and transport activities as well as placement of building rubble in the tunnel (i.e., backfilling). Water quality and groundwater ARARs assessment for the project are addressed in Section 5.3.4, Industrial Area Monitoring. The IA IM/IRA decision document defines the program to address the monitoring requirements for the IA and ensure that monitoring is sufficient to detect potential releases to groundwater and surface water. The Action Levels and Standards Framework (ALF) in Attachment 5 of RFCA (DOE 1996) was developed by consensus among the DOE, EPA, and CDPHE with stakeholder input. As stated in ALF, the strategy for groundwater is intended to prevent contamination of surface water by applying maximum contaminant levels (MCLs) as groundwater action levels. Groundwater action levels are based on a two tier

approach, Tier I action levels (100 times the maximum contaminant levels [MCLs]) identify sources for accelerated cleanups, and Tier II are action levels which are considered protective of surface water (i.e., MCLs). Under RFCA, if Tier I action levels are exceeded, an evaluation to assess the potential impact the contaminated groundwater poses to surface water is performed. If, based on the evaluation, it is determined that surface water is threatened, a remedial action or management action is pursued. If, based on the evaluation, it is demonstrated that the groundwater plume does not present a risk to surface water (regardless of contaminant concentration), a remedial action or management action is not necessary. However, under the latter circumstance, monitoring is required and is accomplished per RFCA by the Integrated Monitoring Program. At present, well 22996 monitors downgradient water quality specific to the 886 Cluster Closure Project.

Requirements of §2.1.2, §2.1.12, and §2.1.14 are addressed in the IM/IRA. Management of hazardous waste, PCB waste, and waste water treatment sludge or liquids generated during decommissioning are addressed in Sections, 7.2.2.1, 7.2.3, and 7.2.2.4, respectively. Compliance with these ARARs will ensure that these prohibited waste materials are not placed in the tunnel during backfilling.

Requirements of §2.1.3 and §2.1.8 are addressed in the HASP (RMRS, et al 1998). Nuisance conditions and access will be controlled by restricting access to the area during decommissioning activities which encompasses placing building rubble in the tunnel. Access control is described in Section 8.4 of the HASP. HASP implementation will ensure that entry into the cluster area is restricted to project personnel that have completed the required training, medical surveillance, wear the prescribed PPE, signed-in on the RWP and reviewed the AHA, as applicable. Other nuisance conditions such as noise are also addressed in the HASP. With respect to §2.5.6, prevention of nuisance conditions beyond the boundary after closure, the potential for nuisance conditions attributable to the tunnel and backfill will be unlikely because the area will be re-graded and re-vegetated to a condition that is indistinguishable from the native landscape.

With respect to the requirements of §2.1.6, incidental water, such as storm water run-on, can be controlled during decommissioning activities by engineered measures such as a storm water containment berm. Incidental water collected within the berm will be handled per 1-C91-EPR-SE.01, Control and Disposition of Incidental Waters.

The requirements of Section §2.1.10 and §2.1.16, are addressed by the intended approach to backfilling the tunnel and site-reclamation. During decommissioning, three to four feet of top soil over the tunnel and the tunnel's ceiling will be removed, so that the tunnel can be backfilled from ground surface. The material placed in the tunnel will be compacted. For closure purposes, the top soil will be re-used to cover the compacted material. Re-grading to the elevations consistent with the local topography, followed by re-vegetation, will result in an area that will be indistinguishable from the native landscape and in good aesthetic appearance. Re-vegetation of all disturbed areas will be performed in accordance with guidance provided by ecologists to ensure that the appropriate species for the area is planted and that non-endemic species are not introduced. These site reclamation measures will result in an area that prevents ponding, windborn debris, and wind erosion as well as reduces surface infiltration and any resulting water pollution.

Because both the tunnel and building rubble will be decontaminated to unrestricted release conditions, water pollution in excess of ARARs which could be attributed to the tunnel and backfilled building rubble is not likely. Requirements

of §2.2.1 and §2.5.5 for groundwater monitoring and attainment of ARARs are incorporated under implementation of

the Integrated Monitoring Program and IA Monitoring requirements.

### **7.2.3 Toxic Substances Control Act**

TSCA defines criteria to guide management and disposal of PCBs. Fluorescent light ballasts, a gasket in Room 111, purple (light and dark) paint from HEUN lines, green paint with brownish/red base coat on electrical utility boxes, and potentially oil in the hydraulic pump for the horizontal split table in Building 886, Room 101 are the sources of PCBs in the cluster. Any other materials, if identified through in-process characterization during decontamination and decommissioning as suspected of containing PCBs will be managed in accordance with 40 CFR Part 761, Disposal of PCBs, if determined to contain >50 ppm PCBs.

Light ballasts marked "No PCBs" or "PCB free" will be managed as solid waste and disposed at a sanitary landfill. Ballasts marked "PCBs" or not marked and not leaking will be packaged for disposal at a TSCA-permitted facility. Leaking PCB light ballasts and unmarked light ballasts will be managed as fully-regulated PCB articles.

### **7.3 Location Specific Requirements and Considerations**

No location specific requirements are associated with this action.

### **7.4 Requirements To-Be-Considered**

Due to the radiological contamination in the 886 Cluster, guidelines contained in DOE Order 5400.5 are identified as TBC. DOE Order 5400.5 will be followed in areas known to be radiologically contaminated to ensure the protection of the workers, public, environment. In addition, DOE Order 5820.2A, "Radioactive Waste Management," is also identified as TBC and contains the requirements for the management and packaging of LLW.

## 8.0 Environmental Consequences of the Proposed Action

The National Environmental Policy Act (NEPA) requires that actions conducted at the RFETS consider potential impacts to the environment. The Memorandum of Secretarial Officers and Heads of Field Elements, dated June 13, 1994, issued by the Secretary of Energy, Hazel O'Leary and entitled "The National Environmental Policy Act Policy Statement" defines the DOE policy for integrating the NEPA process into the CERCLA decision making process. While no separate NEPA documentation is required for this effort, RFCA (and DOE policy) requires DOE to consider environmental impacts of the proposed action and of alternatives as part of this document.

The proposed decontamination and decommissioning activities for the 886 Cluster involve dismantling activities such as disconnection of electrical power, disassembling of equipment, further decontamination (if deemed necessary) in the area-specific work plans, and demolition of facilities. Decommissioning of the tunnel connecting Buildings 886 and 875, the subsurface portion of Building 875, and Building 828 may require sub-grade demolition or stabilization.

Given the existing environmental and industrial setting of the 886 Cluster, environmental impact issues associated with the proposed decontamination and decommissioning activities for the 886 Cluster are limited in scope. Many of these activities are categorical exclusions under DOE's NEPA regulations (i.e., demolition/disposal of facilities; disconnection of utilities; reducing surface contamination). Activities are not anticipated to have direct or indirect, or irreversible and irretrievable impacts to natural resources at RFETS and ultimately will improve natural resources. The proposed activities are unlikely to result in discernible adverse effects to biological resources, including vegetation, wetlands, wildlife habitat, and state or federal sensitive (e.g., threatened or endangered) species populations or habitat. The facilities to be decommissioned are not located on a flood plain and the proposed activities will not affect or be affected by, any flood plain. No wild and scenic rivers, prime agricultural soils, parks or conservation areas, or natural resources will be affected. The proposed activities will provide employment for a very small number of people, most of who are expected to come from the current Site work force; as a result, the activities are also unlikely to result in adverse socioeconomic effects. Therefore, the discussion of environmental impact issues focuses on the following areas of potential impacts:

- Mobilization of radioactive and other contaminants into the environment via soils, air, surface waters, or groundwater;
- Health and safety of workers who may be exposed to radioactive and toxic or hazardous materials (including lead and PCBs), and health and safety of the public, both during normal decontamination and decommissioning activities as well as accidents;
- Environmental issues associated with waste management, including the contribution of wastes generated by the proposed activities to the decreasing site-wide capacity for interim storage and transportation of waste;
- The physical removal of Building 886 as a historic structure that is eligible for the National Register of Historic Places and a secondary contributor to a potential Historic District comprised of Cold War Era facilities at Rocky Flats; and
- The project's contribution to site-wide cumulative impacts.

## 8.1 Geology and Soils

The decommissioning of the 886 Cluster will disturb minor land acreage, most of which has been previously disturbed. Decommissioning of the tunnel and subsurface structure associated with Building 875 and Building 828 can be accomplished by either stabilizing the structures and backfilling, excavation and backfilling, or some combination thereof. Additionally, some re-contouring of the soils will likely be necessary after facilities are removed to restore soil in areas disturbed by demolition equipment. Disturbed soils will be re-vegetated as necessary to avoid soil erosion. Contamination of soils from decommissioning activities is not expected because facility structures will be decontaminated or fixed prior to demolition of the structures themselves.

## 8.2 Air Quality

Potential impacts to air quality resulting from the decontamination and decommissioning of the 886 Cluster facilities include radionuclide emissions resulting from the dismantlement and removal of equipment and fugitive dust emissions resulting from demolition and transportation activities. Air emissions from these activities will be controlled and monitored in accordance with the RFETS Health and Safety Practices Manual and projectspecific particulate control plans. The sources of PCBs within the cluster are a gasket in Building 886, Room 111, purple (light and dark) paint from HEUN lines, green paint with brownish/red base coat on electrical utility boxes, potentially oil in the hydraulic pump for the horizontal split table in Building 886, Room 101, and light ballasts. In general, cleanup and removal of materials and equipment contaminated with PCBs has a very small potential to cause a release to air. Management of the contaminated materials and equipment in accordance with current Site procedures will result in minimal risk to personnel.

Decontamination, dismantlement, and demolition activities in the 886 Cluster have the potential to release radionuclides to the air. Decontamination and dismantlement activities take place within the room and the room exhaust is equipped with high efficiency particulate air (HEPA) filters. This essentially eliminates the potential for a radionuclide release short of an accident during the transportation of the contaminated materials. Stack monitoring is also conducted to ensure the integrity of the HEPA filtration equipment. Fugitive dust emissions will result from the transportation of materials and wastes from the 886 Cluster and sub-grade demolition and subsequent re-grading associated with site reclamation. Mitigative measures will be taken to minimize the potential for short-term fugitive dust emission during the demolition of the structures. Heavy equipment will be used to reduce the cluster facilities; however, because of the distance of the 886 Cluster from Site boundaries, the short-term impacts are limited to personnel working in areas proximate to the cluster. Additionally, miscellaneous hazardous materials will be removed from several structures within the 886 Cluster. These materials will be managed in accordance with existing, Site procedures and there will be little risk for air emissions.

## 8.3 Water Quality

Because decommissioning of the 886 Cluster will potentially remove portions of structures below ground level and soils under building foundations will be exposed, silt fencing or similar protective devices may be installed to prevent or minimize the possibility of water-borne soil leaving the immediate area and entering drainage ways. Demolition activities may, however, deposit small amounts of debris on the surrounding pavement or ground surface that could be carried away by storm water runoff. Quantities of such material are expected to be small. Soil exposed after building foundations are demolished and subsurface decontamination and decommissioning activities (i.e., 875 tunnel, the subsurface 875 structure, and the Building 828) are not expected to impact storm water runoff, storm

water percolation, or surface water flow characteristics. Demolition activities will be performed after the structures have been decontaminated. Soil verification samples will be collected to ensure contamination, if present, is below RFCA Tier I Subsurface Soil Action Levels prior to site reclamation.

Among the techniques that may be used for decontamination of the 886 Cluster is the use of water or steam to remove contamination and loose debris. While this technique is effective in removing contamination, it also generates large volumes of potentially contaminated water and may even contribute to the potential spread of contamination. Surface water samples from the 886 Cluster drainage sub-basin will be collected using an automated station location to collect samples from the entire sub-basin's runoff. If water is generated from decontamination it will be treated prior to release, if required.

Decontamination activities associated with the 875 tunnel, the subsurface 875 structure, and the Building 828 are not expected to impact groundwater. Demolition will be performed after the structures have been decontaminated. Soil verification samples will be collected to ensure contamination, if present, is below RFCA Tier I Subsurface Soil Action Levels and for Environmental Restoration ranking.

## **8.4 Human Health Impacts**

Decontamination and decommissioning has the potential to expose project workers, non-project workers, and the public to radiological and other contamination. Disruption of contaminants or hazardous materials increases the chance of the contaminant or materials being dislodged, becoming airborne, and being inhaled by or deposited on humans.

### **8.4.1 Radiological Impacts**

For project workers, deactivation and decontamination activities for the 886 Cluster are estimated to result in a total dose of 0.4 person-rem. This exposure would be expected to result in less than 1 ( $2 \times 10^{-4}$ ) latent cancer fatalities, assuming the same worker group conducted both the deactivation and the decontamination activities. Doses to collocated workers from decontamination and decommissioning operations for the 886 Cluster alone have not been evaluated. However, the annual radiological exposure of a maximally exposure collocated (unprotected) worker as a result of Site-wide closure activities is estimated at 5.4 mrem. The corresponding risk of a latent cancer fatality to this worker is 2 in 1,000,000 (DOE 1997b).

Annual dose to the maximally exposed off-Site individual from Site-wide closure activities is estimated at 0.23 mrem, with a corresponding excess latent cancer fatality of 1 in 10,000,000. The annual dose to the public resulting from all activities in the RFETS closure project, at the peak time of exposure (1997 - 2006), is expected to be 23 person-rem, or a total of 23 rem, for all of the 2.7 million people projected to be living within 50 miles of the Site in 2006. This annual dose of 23 person-rem would be expected to result in less than one (0.01) latent cancer fatality in the entire Denver area population. Estimated annual dose to the maximally exposed off-Site individual is well below the applicable standard of 10 mrem/yr (DOE 1997b).

Estimated doses from the 886 Cluster project are expected to be a small fraction of those estimates for Site-wide activities, as described above. For comparison purposes, DOE's annual limit for occupational exposure as a result of all exposure pathways is 5,000 mrem per person. The Site standard for annual exposure is 750 mrem per person.



Natural background radiation in the Denver area results in an annual exposure of approximately 350 mrem per person.

Exposures to workers and the public will be controlled and monitored in accordance with the RFETS Radiation Control Manual.

#### **8.4.2 Non-Radiological Impacts**

Non-radiological health effects (from exposure to chemicals) are measured by a hazard index. A hazard index greater than one is considered the basis for concern. For the full suite of Site closure activities (including decommissioning of all facilities), a hazard index of 1.2 has been calculated for a collocated worker who is chronically exposed to all chemicals of concern simultaneously during working hours over the entire period of Site closure. The corresponding cancer risk is 5 in 100,000 (DOE 1997b).

For the full suite of Site closure activities (including decommissioning of all facilities), a hazard index of 1.5 has been calculated for a member of the public who is chronically exposed every day for 70 years to all chemicals of concern simultaneously (a highly unlikely event). A more reasonable scenario of exposure to a single chemical showed hazard indices of well below one for each potentially released chemical; analysis of potentially carcinogenic air pollutants indicates a cancer risk of 3 in 10,000,000 for the maximally exposed off Site individual (DOE 1997b).

Estimated non-radiological impacts from the 886 Cluster decommissioning are expected to be a small fraction of those estimates for Site-wide activities, as described above. Exposures to workers and the public will be controlled and monitored in accordance with the RFETS HSP Manual.

#### **8.4.3 Occupational Hazards**

In addition to exposure to radiological and chemical hazards, workers at the Site are expected to be exposed to a variety of industrial hazards such as heavy machinery, repetitive motion tasks, and physical agents such as heat and cold. Using a general industry standard for construction to estimate injury and illness cases, Site closure activities are estimated to result in 584 cases of injury and illness during the peak activities period (1997 - 2006) (DOE 1997b). The contribution of these cases which would be estimated to result from the 886 Cluster project alone would be less than the total Site estimate.

The general industry rate of injury and illness is considerably higher than the historic incidence rate for the Site; occupational hazards will be controlled, mitigated, and monitored in accordance with the RFETS HSP Manual.

#### **8.5 Plants and Animals**

Because the 886 Cluster is located in the previously disturbed IA, impacts to plants and animals are expected to be minimal. Possible minor impacts to other vegetative areas may be distribution of fugitive dust containing undesirable materials among plant species. Additional impacts may occur in vegetation associated with increased traffic in order to accommodate the decommissioning equipment. Increased traffic, both vehicular and pedestrian, could result in some vegetation disturbance.

Mammals such as rats, mice, and raccoons are known to be residents of or visitors to the IA. Additionally, cats reside under T886A. These mammals would be displaced, and some mortality would likely occur as a result of decommissioning activities. Bird nests attached to facilities planned for demolition would be destroyed, although no direct bird mortality is anticipated. The Preble's Meadow Jumping mouse, a species proposed for listing as endangered, is known to exist in downstream areas of the 886 Cluster. The 886 Cluster activities will not be performed in known Preble's Jumping Mouse habitat.

## **8.6 Environmental Issues Associated with Waste Management**

Environmental impact issues associated with waste management are related to human health issues, storage capacities, and transportation.

In general, waste generated from decontamination and decommissioning the 886 Cluster includes contaminated and uncontaminated equipment, tools, electrical conduit systems, piping systems, gloveboxes, and facility structural materials. Decommissioning the 886 Cluster will generate waste as tentatively estimated in Section 6.0.

Decontamination will be performed as necessary to remove radiological contamination and hazardous constituents. Where feasible and whenever possible items will be decontaminated to unrestricted release conditions. Items that have been decontaminated to a unrestricted release condition will be transferred to for use at a different location within RFETS, for use at a different DOE facility, or sent to the PU&D organization for appropriate disposition. Mixed waste generated from decontamination and decommissioning activities will be stored on-Site, and where feasible, shipped to an approved off-Site disposal facility. Hazardous wastes will be managed as waste, where applicable, and disposed in accordance with established procedures. Materials and waste will be characterized, stored, and disposed in accordance with 886 Cluster ARARs.

Waste minimization will be used in the planning and management of the 886 Cluster decontamination and decommissioning wastes. Elimination and reduction of waste generated as a result of decontamination and decommissioning is a high priority. Decontamination options will be evaluated for waste minimization potential and suitable minimization techniques will be implemented (Section 6.0).

With respect to transportation of waste, the 886 Cluster project would generate and package materials suitable to meet DOT transportation requirements (Section 6.0).

## **8.7 Historic Resources**

The environmental impact issue related to historic resources is the loss of Building 886 as a historic structure eligible for the National Register of Historic Places and as a primary contributor to a potential Historic District of Cold War Era facilities. A related cumulative impacts discussion is in Section 8.10.

Sixty-four facilities within the IA, including Building 886 have been identified as important to the historic role of the Site in manufacturing nuclear weapons components during the Cold War. While this facility is less than 50 year old, one of the usual criteria for determining eligibility is that it is considered historically significant as an essential component of the weapons production activities at Rocky Flats.

The agreement between DOE and the State Historic Preservation Officer concerning the appropriate mitigative measures applicable to these facilities has been completed; rooms within Building 886 were photographed and the facility was described. Drawings and blueprints were collected. The documentation requirements for Building 886 were completed and accepted (National Park Service [NPS] 1997).

The demolition of the 886 Cluster is in support of the Site Mission and is covered under the Atomic Energy Act.

## **8.8 Noise**

Decontamination and decommissioning of the 886 Cluster is not expected to significantly increase noise levels in the Rocky Flats area. Most activities will take place inside the associated facilities so that noise levels, if elevated over ambient levels, will be confined to the 886 Cluster structures in which they are generated. Other less common activities such as scabbling (use of a machine to remove layers of concrete), blasting (use of various materials such as sand, dry ices, or other abrasives to remove superficial contamination), and demolition by backhoe ram, hydraulic cutters, or other devices are expected to generate noise levels higher than ambient levels; however, worker involved in those activities will use appropriate hearing protection devices during activities expected to generate such levels. Outdoor activities will take place at a distance from unprotected workers and the public and thus are not expected to increase noise levels to these populations to an unsafe level.

## **8.9 Socioeconomic Effects**

Potential impacts from the decontamination and decommissioning of the 886 Cluster would contribute to a net overall loss of employment. The current on-Site work force in the facility would either be drawn into the D&D activities for the facility (and potentially for the entire Site) or voluntarily lose employment. In the short term, the decontamination and decommissioning activities could increase the employment level due to increased work force levels associated with the cluster activities. Additionally, in the short term, a modest increase of purchases (raw materials) may result due to the decontamination and decommissioning activities.

Under a hypothetical worse case scenario, if the entire work force currently housed in the 886 Cluster all opted for voluntary separation, the net overall impact would not have a great adverse effect on the Denver Metropolitan area nor would it adversely effect Boulder and Jefferson Counties, where the majority of the work force reside. Taken as a single facility, the net effects are expected to be minimal.

## **8.10 Cumulative Effects**

Impacts associated with the decontamination and decommissioning of the 886 Cluster would eventually contribute incrementally to potential Site-wide cumulative impacts attributed to the overall Site closure program. Some of these cumulative impacts may ultimately prove to be beneficial to the environment, assuming that the activities result, as expected, in the restoration of much of the Site's original, natural condition prior to construction. Removing human occupation, structures, and paved surfaces and re-establishing native grasses and other vegetation could restore native plant communities and increase wild life habitat, including threatened and endangered species. Cleaning up contamination will reduce health risks to human and animal populations.

As with decontamination and decommissioning of the 886 Cluster, Site-wide decontamination and decommissioning of structures will generate low-level, low-level mixed waste, and industrial (landfill) waste. Existing, interim storage

for radioactive waste is limited on-Site (DOE/EA -1146), and eventually, as Site-wide decommissioning progresses, additional storage capacity may be needed. The same is true for industrial waste; the existing landfill is nearing capacity and is scheduled for closure under the Site restoration program in 2006. All sanitary landfill waste will be transported and disposed at an off-Site landfill.

Also demolition of the 886 Cluster is part of a potential cumulative effect to historic resources. Demolition will result in the physical removal of an historic structure that is eligible for the National Register of Historic Places and primary contributor to a potential Historic District comprised of Cold War Era facilities. Other historic structures within this district are also proposed for decommissioning. The cumulative effect of these removals may be significant. The landscape would take on a less industrial and more open, rural appearance, similar to the range land that characterized the area prior to the plant was constructed.

## 8.11 Mitigation Measures

Mitigation measures are prescribed to reduce or avoid potentially adverse effects associated with a proposed activity. For the decontamination and decommissioning of the 886 Cluster, mitigation measures will be considered in the areas of human health, worker safety, release of emissions, and mobilization of contaminants, and cultural resources.

Decontamination and decommissioning will be conducted in accordance with applicable worker and public health and safety programs; activities will be managed so that emissions and discharges are within applicable regulatory limits. As required, decontamination and decommissioning will occur within containment of existing facilities or temporarily constructed facilities (e.g. tents) with fluctuating drainage, air filtration, and other safety and environmental protection systems commensurate with risks inherent in the activities being conducted.

A runoff management plan will be developed and implemented to avoid contamination of groundwater or surface water.

If, during demolition activities, groundwater is encountered, the water will be characterized for contaminants and a determination of its acceptability for discharge obtained.

Precautions will be taken to ensure compliance with the Migratory Bird Act which prohibits destruction of birds or their nests, active or inactive, without a permit. Building surveys for such nests in the 886 Cluster will be conducted prior to demolition and activities will not be initiated until results of the survey have been approved by site ecologists and any required mitigative actions taken.

Activities will be applied, as appropriate, to ensure protection of the Preble's Meadow Jumping mouse as follows:

- Containment of any potential contamination (chemical and radiological) associated with decontamination and decommissioning such that this contamination cannot enter waterways.
- Placement of silt fencing downstream/downhill of any excavation of soil disturbance and construction of diversion ditches and sumps to contain contaminated sediment.

Facilities determined to be eligible for the National Register of Historic Places will not be modified or damaged prior to completion of documentation according to standards set forth in the programmatic agreement among the

DOE/Rocky Flats Field Office, the Colorado State Historic Preservation Office and the Advisory Council on Historic Preservation Office and the Advisory Council on Historic Preservation.

### **8.12 Unavoidable Adverse Effects**

The 886 Cluster decontamination and decommissioning activities, if conducted as proposed, will have the following unavoidable adverse effects:

- Physical removal of an historic structure that is eligible for the National Register of Historic Places and a secondary contributor to a potential Historic District comprised of Cold War Era facilities;
- Short-term increases in contaminant concentrations in air emissions and water discharges;
- Improbable but potential radiation and chemical exposures to workers, collocated workers, and the public, resulting in a small, but increased risk of adverse health effects;
- Possible industrial accidents, resulting in injury and illness; and
- Increased noise levels for the duration of decontamination and decommissioning activities.

### **8.13 Short-term Uses and Long-term Productivity**

Unlike most projects which commit a Site to a particular use for a period of time, the effect of decontamination and decommissioning will be to undo past commitments concerning use of the Site and open up a new broad range of potential future uses. Decommissioning does not commit the Site to a particular land use, rather, decommissioning of the 886 Cluster will be one step in the process of ending one use and opening consideration for a variety of other possible future short- and long-term uses.

### **8.14 Irreversible and Irretrievable Commitments of Resources**

Decontamination and decommissioning is essentially a destruction project eliminating existing uses, not a construction project consuming land and building materials. Decontamination and decommissioning of the 886 Cluster will release land and perhaps some facilities for other uses. Funds, labor, equipment, fuel, tools, personal protective equipment, waste storage drums, and similar items are resources that will be irretrievably committed to the decontamination and decommissioning project. There are no anticipated irreversible or irretrievable commitments of natural resources as a result of the proposed action.

## **9.0 QUALITY ASSURANCE**

A commitment to program quality and continuous improvement is applied at all levels from project start through project completion. Adherence to the commitment is instrumental in the success of the project. All project personnel are responsible for following approved quality assurance (QA) program requirements and participating in quality improvement activities.

QA/quality control (QC) personnel are involved at the initial planning stages of the project, during site preparation, and during project execution. The QA Organization assumes a proactive role during the project by identifying and/or preventing potential problems or shortcomings; offering solutions; and assisting in corrective action steps. QA personnel administer and perform duties in accordance with approved QA program requirements. The scope of the QA/QC programs ensures:

- consistency and effective implementation of management/DOE directions and policies with other project/DOE requirements through audits and surveillance;
- assurance of document review and approval requirements through review of applicable procurement and work documents;
- validity of data gathering methodologies;
- compliance with standard operating procedures;
- integrity of waste packaging and incoming materials through inspections;
- facility characterization through performance of facility walk-downs;
- initiation of monitoring projects for potential improvements; and,
- emplacement of corrective action initiatives.

### **9.1 Quality Assurance Plan**

A QA Plan (QAP) will be developed to control and monitor the quality aspects of the project activities and will describe roles, responsibilities, and methodologies for ensuring compliance with DOE 5700.6C and 10 CFR 830.120. The project will follow the requirements set forth in the QAP.

### **9.2 Program Requirements**

The QA elements of the QA Program will be identified and defined in the context of implementing programs and controls in the QAP. Specific programs used to control project activities are also referenced in the QAP (e.g., floor level procedures, plans, and documents). The QAP applies to all project personnel. Project personnel will understand the program's impact from training, indoctrination, and the commitment evidenced by management.

One of the primary aspects of the QA Program is management involvement. The project will be implemented through a management team. The criterion also includes self assessments by the management team.

#### **9.2.1 Quality Assurance Systems and Requirements**

Decommissioning activities will be appropriately planned in accordance with the provisions of the QAP. If activities deviate from planned outcomes and indicate significant conditions adverse to quality, personnel are required to stop the activity until corrections can be made.

All personnel are responsible for performing activities in accordance with approved documents; identifying and participating in quality improvements; customer interface, supplier interface and processes with which they are associated. The project team is responsible for exercising stop work authority over significant conditions adverse to quality; and for attending training.

The QA Program is inherent to the work. This is accomplished during the planning of work through the participation of Quality Engineers. Integration of the QA program at the onset of the project will reduce the need for extensive inspections and assessments. This early integration supports the primary principle of a QA Program whereby the achievement of quality is embedded in the work processes, and that assessment should only be a tool for monitoring quality and continuous improvement.

### **9.2.2 Personnel Qualifications and Training**

Project personnel are qualified to perform their respective tasks based on a combination of related experiences, education, and training. Education and experience constitute the primary means of qualification. Decommissioning management, in conjunction with training program administrators, are responsible for providing any additional skills and training prior to assigning employees specific project duties. Typical training methods include computer based training, classroom instruction, required reading, and on-the-job training. Qualification requirements and training records are maintained and retrievable through the project manager. These records reside at a centralized training record repository.

The QA Manager establishes requirements for the competency of individuals planning, developing, assessing, and inspecting QA related work activities. Quality Engineers have the training, qualifications, technical knowledge, and experience commensurate with the scope and complexity of the decommissioning activities being evaluated. Evidence of competency, and maintenance of competency have been established and recorded in accordance with the QAP.

### **9.2.3 Improvement**

Employee participation in the assurance of quality and the continuous improvement process, is achieved through taking ownership of their processes, and actively seeking means to improve those processes. Decommissioning project management will use lessons learned in each phase of the project to improve succeeding phases. The project team approach is one of the management tools employed to enhance productivity and continuity throughout the project.

Items, materials and hardware that do not meet established requirements are identified, segregated, controlled, documented, analyzed and corrected in accordance with the Nonconformance Reporting (NCR) process. Activities, services and processes that do not meet established requirements are also identified and corrected in accordance with the Corrective Action Process (CAP). Quality Engineers are responsible for supporting the NCR and CAP processes and assisting in the disposition and correction of identified deficiencies.

#### **9.2.4 Documents and Records**

Quality affecting documents, such as work plans, operating procedures, and health and safety plans are prepared and controlled in accordance with approved processes. These documents receive the required reviews and approvals, they are uniquely identified, and their distribution is formally established. Other essential policies, plans, procedures, decisions, data, and transactions produced by the contractor are documented to an appropriate level of detail. Document reviews by subject matter experts, management, and QA are performed as appropriate and as specified in governing procedures. Quality and administrative records are prepared and managed to ensure that information is retained, retrievable, and legible in accordance with approved procedures.

#### **9.2.5 Work Processes**

Decommissioning processes and activities are controlled to a degree commensurate with the risks associated with the decommissioning process or activity. Documented and approved instructions are incorporated to control decommissioning processes and activities, maintaining compliance with referenced standards, engineering specifications, workmanship criteria, quality plans or other requirements.

Work is controlled from the onset of the project through project management procedures, engineering procedures, records management procedures, construction management procedures and work packages. The IWCP Work Package is the overall, formalized process that controls the development of the decommissioning work packages. The WMP and controls ensure that the generation and handling of waste meeting governing requirements.

#### **9.2.6 Design**

The design of data collection operations will be defined, controlled, verified and documented. The design process will ensure that data are traceable.

Sound engineering, scientific principles, and appropriate technical standards are incorporated into all design activities to assure intended performances. Site infrastructure programs, primarily the Conduct of Engineering Manual and Decommissioning Protocols, provide controls for the design of items and processes. Design work includes incorporation of applicable requirements and design bases, identification and control design interfaces, and verification or validation of design products by independent, qualified individuals, subject matter experts or groups other than those who performed the work. The verification and validation is completed before approval and implementation of the design.

#### **9.2.7 Procurement of Items and Services**

The Decommissioning Program implements a procurement and subcontracts system that complies with the appropriate protocols required by RFETS and RMRS. All procurement documents receive a documented, independent quality review by Quality Engineers to assure incorporation of appropriate QA requirements. Procurement documents are retained and administered in accordance with approved procedures.

Control systems will be employed for identification, maintenance, and control of items, including consumables. The controls ensure that items are properly labeled, tagged, or marked, and that only appropriate items are used for the



application,. Controls ensure that items are identified, handled, stored, transferred, and shipped in a manner that prevents loss, damage, or deterioration.

### **9.2.8 Inspection and Acceptance Testing**

Decommissioning activities or items that require inspections and/or acceptance testing will be specified in work-controlling documentation, such as IWCP Work Packages, characterization plans, operating procedures, and data management plans. Acceptance criteria and hold points will be clearly defined and in accordance with approved procedures. Inspections are designed and controlled in accordance with approved processes. Oversight and acceptance of services is performed in accordance with approved documents by qualified personnel from the Decommissioning Program staff or by the designated Quality Engineer.

Testing is conducted when necessary to verify that items and processes perform as planned. Testing activities are planned and implemented in accordance with approved procedures that include provisions for performing the test, item configuration, environmental conditions, instrumentation requirements, personnel qualifications, acceptance criteria, inspection hold points, and documentation requirements for records purposes. Only controlled and calibrated measurements and test equipment are used for testing, measuring, and data collection activities.

### **9.2.9 Assessment Program**

An assessment program and procedures for planning and implementing assessments will be established and maintained. Independent assessments are scheduled by an independent branch of the QA organization, based on the hazard and QA performance indicators of the activities being conducted. Assessments are conducted by qualified QA personnel, independent of the project. The results of assessments are documented, reviewed by appropriate management, and are tracked to verify development and effective implementation of corrective actions.

As previously indicated, the QA organization consists of personnel who participate with and are matrixed to the decommissioning organization. These personnel conduct monitoring and surveillance activities as a continuous barometer of QA compliance and implementation. Decommissioning Program management also performs documented Management Assessments of the decommissioning organization to determine the effectiveness of the QA Program and overall organization performance. In addition to the assessments completed within the QA organization the project management has established the following monthly reviews:

- Review compliance with IWCP Work Package requirements (2 packages selected at random)
- Inspect for adequate training requirements (5 people selected at random)
- Verify proper PPE is being worn (10 people selected at random)
- Verify RWP requirements are being followed (2 crews selected at random)
- Verify pre-evolution briefings are adequate (2 crews selected at random)

These inspections are documented in project logs or in the formal report to the project manager.

## 10.0 PROJECT SCHEDULE

The decontamination and decommissioning of the 886 Cluster will require 24 months to complete. This proposed schedule from the Lifecycle Baseline (Figure 10- 1) is subject to change due to regulatory and public concerns, budgetary constraints, weather delays, etc. The schedule does not represent an enforceable commitment and modifications to the schedule do not constitute a modification the decision document.

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***Figure 10-1. Schedule. (page 1 of 2)***

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***Figure 10-1. Schedule. (page 2 of 2)***

## 11.0 ORGANIZATION AND RESPONSIBILITIES

The project organization is presented in Figure 11-1 and shows the responsible project personnel, subcontractors and plant support contacts. Roles and responsibilities for the project are also described in the HASP (RMRS et al., 1998). RMRS and SSOC have teamed to plan and manage the project. Support will be coordinated for the decontamination and decommissioning through the appropriate RFETS contractor or subcontractor. Specifically, radiological support will be coordinated through the Building Manager. The Radiological Operations Technical Supervision is a direct report to the Building Manager. Radiological Engineering and Radiological Operations have been combined into one organization and will be drawn upon for any additional resources. Access control to the area will be in accordance with the HASP.

The organization and responsibilities described herein do not represent an enforceable commitment and modifications to the organization and responsibilities do not constitute a modification to the decision document.

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***Figure 11-1. Organizational Chart***

## 12.0 RESPONSIVENESS SUMMARY

Public participation in the decision process is promoted via the public comment period. Comments and questions raised on the IM/IRA Plan during the comment period and the responses are presented below.

Comments from DeAnne Butterfield, Executive Director of the Rocky Flats Local Impacts Initiative:

*DB-1a Comment:*

*We request a meeting prior to specific action plans for the tunnel. We have two concerns. First that the tunnel contains radiological contamination. Rather than decontamination only to a free release standard, we would like information about the implications of an ALARA approach and what the residual levels would likely be.*

Response:

DOE will be happy to arrange a meeting with representatives from the Rocky Flats Local Impact Initiative to discuss the plans for the tunnel as outlined in the IM/IRA. The unrestricted release activities to be performed in conjunction with B886 D&D activities are governed by 10 CFR 835. Specifically, the unrestricted release limits for alpha and beta contamination are specified within an appendix to this section of the CFR. These limits were adopted from NRC Regulatory Guide 1.86 which is the current standard for release for the commercial nuclear industry. More recently, the same unrestricted release limits were incorporated by the federal government into the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM).

B886 will conduct operations involving ionizing radiation so that exposure to personnel is as low as reasonably achievable (ALARA). This ALARA principle requires radiation doses to employees, the public, and the surrounding environment be as low as reasonably achievable considering programmatic requirements, economic limitations, and the impact on society.

*DB-1b Comment:*

*Secondly, the Rocky Flats Industrial Area Transition Task Force has recommended that residual infrastructure, even if below action levels, should be removed in order to preserve options for future reuse of the industrial area. We have concern that leaving a tunnel in place backfilled with debris is not in the spirit of the RFCA Vision that says the site will be suitable for use as an employment center. This is especially true since 886 is a pilot project.*

Response:

The DOE will discuss this matter with RFLII before taking any irreversible actions. Regardless of the final disposition of this material, the structure of the tunnel will be decontaminated to unrestricted release criteria. Similarly, building rubble (i.e., concrete) will also be decontaminated for unrestricted release, so that it would be suitable for use as backfill. The 3 to 4 feet of top soil over the tunnel and the tunnel's ceiling will be removed, so that the tunnel could be backfilled from ground surface. The material placed in the tunnel will be compacted. Top soil will be re-used to cover the compacted material and the area will be re-vegetated. Under any disposition scenario, the area will be indistinguishable from the native landscape and as a result, conducive to multiple future use considerations. Even if the tunnel were to remain in place, DOE does not believe that this structure would comprise site re-development.

Backfilling the excavation with building rubble is considered favorable from an engineering and construction standpoint because, consistent with engineering practice, it is considered easier to excavate rubble than to excavate native materials. As a result, no substantial impediments would be anticipated in the event intrusion into the backfilled tunnel or removal of the backfill from the tunnel is necessary for future development projects.

Additionally, this approach is environmentally favorable because it does not require the transport and disposal of clean building rubble and the acquisition of backfill from on- or off-site sources. Transport and disposal of clean building rubble will result in increased traffic and use of sanitary landfill space which could be reserved for more appropriate sanitary waste. The acquisition of backfill from on- or off-site sources unnecessarily impacts other environments and will result in increased traffic and dust generation.

*DB-2 Comment:*

*The IM/IRA does not specify the preferred disposition of building rubble. It suggests that rubble will be defined as sanitary waste if it meets the free release criteria of 10 CFR 835. Has RFETS made a policy decision about this issue? We understood it would be developed in cooperation with the D&D Working Group. Is the rubble planned to be disposed inside the tunnel, at another location on the site, and/or taken to Erie?*

*Response:*

The Solid Waste Rules allows provision for inert material and are ARAR for the project. Concrete, brick and cinder blocks are within the definition of "inert material" under the Colorado Solid Waste Disposal Sites and Facilities Regulations. (See 6 CCR 1007-2, Part 1, Section 1.2). By CDPHE policy, wood and gypsum wall board are not considered inert material. This definition is applicable to building rubble that will be used to backfill the B886 tunnel.

Section 4 of the Solid Waste Disposal Sites and Facilities Regulations is entitled "Construction Debris and Inert Material Landfill Sites and Facilities." At this time, the section is reserved and no specific substantive requirements for inert material disposal have been promulgated. As a matter of statewide policy, CDPHE currently allows disposal of inert materials in facilities that do not meet the minimum technical requirements (e.g., liner, leachate collection, impermeable caps, control of explosive gases) applicable to new municipal solid waste landfills or other landfills that accept wastes likely to decay.

The CDPHE statewide policy requires inert material facilities to satisfy, on a case by case basis, relevant standards found in 6 CCR 1007-2, Part 1, Section 2. The following requirements are relevant and appropriate for disposal of inert material in the B886 tunnel:

- meet air, water quality and groundwater ARARs (see §2.1.1, §2.1.4, §2.1.5 and §2.1.15)
- prevent disposal of hazardous waste, PCB waste, waste water treatment sludge or liquids (§2.1.2, §2.1.12, and §2.1.14)
- prevent nuisance conditions (§2.1.3)
- control stormwater run-on (§2.1.6)
- control access (§2.1.8)
- provide adequate final cover to prevent ponding, wind erosion and water pollution (§2.1.10)
- prevent windborn debris movement (§2.1.11)

At closure, the inert material disposal facility must:

- be left in an orderly condition with good aesthetic appearance (§2.1.16)
- provide groundwater monitoring, as appropriate, in accordance with the RFETS Integrated Monitoring Plan (§2.2.1).
- attain ARARs (especially surface water requirements) on a long term basis (§2.5.5)
- prevent nuisance conditions beyond the boundary after closure (§2.5.6)

*DB-3 Comment:*



*We recognize there may not be a large number of items of personal property in this building cluster suitable for release to the public, but as a pilot, the proper procedures should be followed. There may be laboratory items that would be of value to schools or universities, in addition to equipment of interest to RFLII companies. Section 6.2 states that "if the cost to demonstrate that the item is not contaminated exceeds the cost for waste disposal, the items will be disposed of as waste." This is not accurate. Our understanding of the process is that the value of the item must also be factored in as an offset to rad screening costs. May we have a list of the inventory and an opportunity-- as we did for Building 779--to review the determinations prior to equipment being determined as waste?*

Response:

The RFETS Property Utilization and Disposition (PU&D) process was used to disposition the general office and laboratory equipment. As a result of this process, the general office equipment went to public auction. The laboratory equipment remaining in the cluster at this time is contaminated. Per the process, the contaminated equipment could be released to another DOE facility; however, after contacting potential users at other DOE facilities, no facilities opted to take the equipment. Additionally, because decontamination and performance of the surveys necessary to verify decontamination would result in destruction of the equipment, these items cannot be offered to the public. As a result, the equipment is considered waste.

Comments from Edd Kray, CDPHE:

*EK-1a Comment:*

*General - Several documents/procedures associated with the decommissioning of this cluster are either yet to be developed or have not been submitted to CDPHE. These procedures include: IWCPs for decommissioning areas/rooms; Activity Hazard Analyses for work to be performed; Demolition Plan for the cluster; the soil/slab sampling and analysis plan; and the Final Radiological Survey Plan. The IM/IRA should be written to clearly define what documents need to be developed ...*

Response:

Section 1.2, Scope, has been revised to include a list of the documents which have been prepared or will be prepared during the course of the IM/IRA.

*EK-1b Comment:*

*... what the time frames are for their development, how the LRA is involved (i.e., review and/or approval), and what the time frames are for the LRA review/approval.*

Response:

The schedule for development of project documents are being prepared as resources permit. These issues are discussed and refined at the project status meetings.

*EK-2 Comment:*

*Section 1.2 - Building rubble generated during this project that meets unrestricted release criteria is considered a solid waste. Use of this material as backfill is inappropriate. This material needs to be disposed of in accord with State and County solid waste requirements. Delete reference to disposal as backfill.*

Response:

See responses to comment DB-2. Disposal in this manner is consistent with the present solid waste requirements. Specifically, the Solid Waste Regulations allow for inert material to be used as backfill and the Regulations are ARAR for the project. Concrete, brick and cinder blocks are within the definition of "inert material" under the Colorado Solid Waste Disposal Sites and Facilities Regulations. (See 6 CCR 1007-2, Part 1, Section 1.2). By CDPHE policy, wood and gypsum wall board are not considered inert material. This definition will apply to building rubble used as backfill for the B886 tunnel.

Section 4 of the Solid Waste Disposal Sites and Facilities Regulations is entitled "Construction Debris and Inert Material Landfill Sites and Facilities." At this time, the section is reserved and no specific substantive requirements for inert material disposal have been promulgated. As a matter of statewide policy, CDPHE currently allows disposal of inert materials in facilities that do not meet the minimum technical requirements (e.g., liner, leachate collection, impermeable caps, control of explosive gases) applicable to new municipal solid waste landfills or other landfills that accept wastes likely to decay.

Regardless, under the CDPHE statewide policy, inert material facilities must satisfy, on a case by case basis, relevant standards found in 6 CCR 1007-2, Part 1, Section 2. For that reason the following requirements are relevant and appropriate for disposal of inert material in the B886 tunnel. Specifically, during disposal the activity must:

- meet air, water quality and groundwater ARARs (see §2.1.1, §2.1.4, §2.1.5 and §2.1.15)
- prevent disposal of hazardous waste, PCB waste, waste water treatment sludge or liquids (§2.1.2, §2.1.12, and §2.1.14)
- prevent nuisance conditions (§2.1.3)
- control stormwater run-on (§2.1.6)
- control access (§2.1.8)
- provide adequate final cover to prevent ponding, wind erosion and water pollution (§2.1.10)
- prevent windborne debris movement (§2.1.11)

At closure, the inert material disposal facility must:

- be left in an orderly condition with good aesthetic appearance (§2.1.16)
- provide groundwater monitoring, as appropriate, in accordance with the RFETS Integrated Monitoring Plan (§2.2.1).
- attain ARARs (especially surface water requirements) on a long term basis (§2.5.5)
- prevent nuisance conditions beyond the boundary after closure (§2.5.6)

*EK-3 Comment:*

*Section 2.2 - What is the basis for the 50 PPM lead/metals concentration hazard?*

Response:

The reference was inadvertently included in reference to the lead/metals release criteria and has been removed. The text has been revised to reference only RCRA limits, which is consistent with the decision basis and data quality objectives set forth in the RCLP.

*EK-4 Comment:*

*Table 4-1 - Activities identified include decontamination of lead/metals in paint on floor and walls and decontamination of PCBs from HEUN lines and electrical boxes. Table 4-7, however, indicates no plan to decontaminate either contaminant.*

Response:

Reference to decontamination will be removed from Tables 4-1 and 4-2, as appropriate. Lead and PCB decontamination will not be performed.

*EK-5 Comment:*

*Section 4.1.1.3 - What is the basis for the statement "waste streams that exceeds the toxicity characteristic thresholds.... will not be generated."? Intrusive activities such as scabbling and grinding performed on lead and/or PCB based painted walls and floors will likely generate paint chips. How will these paint chips be managed?*

Response:

The text will be revised to state that these waste streams "are not expected to be generated." Any waste generated will be properly characterized and managed in accordance with the project-specific waste management plan, applicable laws and Site requirements. Moreover, as indicated in response to EK-4, decontamination of lead and PCB material is not planned.

*EK-6 Comment:*

*4.1.3.1 - Again, isn't there a potential to disturb the lead and/or PCB based paint and generate hazardous paint chips?*

Response:

Decontamination of lead- and PCB-contaminated material is not planned. If these waste streams are generated, these waste will be managed in accordance with the project-specific waste management plan, applicable laws and Site requirements

*EK-7a Comment:*

*Section 4.1.3.2 - Further information is needed regarding the soils associated with this activity. Specifically, the IM/IRA fails to identify IHSS 164.2 and PAC 800-1203.*

Response:

PAC 880-1203 was eliminated as an area requiring further investigation per correspondence from EPA Region VIII to DOE RFO dated 12/23/92.

IHSS 164.2 will be listed as a CERLCA designated area in Section 2 along with a brief description of the IHSS.

*EK-7b Comment:*

*Section 4.1.3.2 - A description of these two potential areas of concern should be included. In addition, the sampling and analysis plan for the 886 slab and soils must be developed and approved by the LRA. This sampling and analysis plan must be sufficient to adequately rank the IHSS and under building contamination in the area or justify a No Further Action.*

Response:

As indicated in the response to EK-7a, PAC 800-1203 was eliminated and is considered NFA per 1992 correspondence. A description of IHSS 164.2 will be added to Section 2 with a correction that there is CERCLA designated area in the cluster. Sampling and Analysis Plans will be developed in cooperation with ER, and as stated in the scope (Section 1.2) they will be used for environmental ranking purposes. ER SAPs are routinely provided to the LRA for review and approval.

*EK-8 Comment:*

*Section 5.3.4 - The State's APCD should be included in the monitoring evaluation prior to demolition.*

Response:

The 886 Cluster project has been divided up into five manageable areas (or sub-projects within the 886 cluster project). EM&C's Environmental Compliance and Operations program will review the project information, including characterization data, prior to the initiation of each phase of the project. This includes the KH air program, which will assist the project team in discussing monitoring requirements with the State's APCD, prior to each phase and demolition. This is consistent with Integrated Monitoring Program implementation.

*EK-9 Comment:*

*Table 6-1 - What lead is to be recycled?*

Response:

Recyclable lead in the cluster includes lead bricks and shielding. A footnote will be added to Table 61.

*EK-10 Comment:*

*Section 6.3 - Provide a copy of the 886 Cluster Closure Project Waste Management Plan.*

Response:

A copy will be provided as requested.

*EK-11 Comment:*

*Section 6.4 - Additional information/discussion is needed prior to establishing a temporary unit(s). Specifically, several requirements identified in 6 CCR 1007-3, Section 264.553 are substantive.*

*Response:*

The text has been modified to state that hazardous waste, if generated, will be managed in accordance with waste container management. A reference to Section 7.2.2.1, Waste Storage, has also been included. As stated in Section 7.2.2.1, the information in this paragraph is provided to satisfy the permit waiver conditions in RFCA ¶17.

*EK-12 Comment:*

*P11, par 2 - The paragraph states that radiological contamination was characterized by process knowledge and existing surveys. KH must be reminded that this level of characterization, based on previously obtained information, may not be adequate to provide sufficient detail on residual contamination in order to protect workers and the environment during decommissioning and dismantlement operations. The process of decommissioning is one in which management must expect the unexpected. Radiological contamination may exist in hidden locations, within abandoned piping, under equipment which has been unmoved for years, behind cabinets, under tanks and so forth.*

*Please explain in detail the efforts which 886 staff will make to adequately identify the hidden areas of contamination so that unnecessary exposures or releases will not occur during the decommissioning process.*

*Response:*

The text will be clarified to state that "All work per Site Radiation Controls Manual and approved RSPs." This includes

1. Pre-, in-process, and post-job survey
2. Waste characterization surveys
3. Continuous air monitoring

Radiological contamination is also addressed in the various work control documents produced prior to the commencement of any activity. Specifically, the Activity Hazard Analysis, RWPs, and the IWCPs have contamination as a identified hazard that must be identified, quantified, and controlled. The RWP and IWCP radiological survey requirements are directly transferred from the Site RadCon Manual and the Radiological Safety Practices. Additional surveys are required for waste characterization under the Surface Contaminated Object procedure prior to packaging of the material. With these various overlapping procedural requirements and taking credit for the training and questioning attitude of the RCTs, the project feels that we have the necessary controls in place to radiologically characterize the waste to be generated.

*EK-13 Comment:*

*p19 - The charts mention management reviews in several places without further specificity as to items to be covered, schedules or scope. Please provide a more detailed description of KH's intent regarding management reviews within the responsiveness document. How many will be done? At what phases of the project? What level of FTE resources will be provided? Describe their scope in greater detail.*

Response:

Management review intent, scope and resources available to perform such reviews are part of an on-going process discussed during project status meetings. Text has been added to Section 4.1 which clarifies that the LRA will be notified of readiness to conduct management reviews concurrently with DOE.

*EK-14 Comment:*

*p27, Table 4-6 - These unrestricted release activities are, of course, only applicable to surface contamination and surface activity levels. No mention is made of standards for any materials which may be contaminated in volume. Will 886 continue to apply the DOE no-rad-added standard to volumetric materials from the 886 project?*

Response:

DOE's no-rad-added applies.

*EK-15 Comment:*

*p28, sec.4.1.2 - The decision document should be prepared in adequate detail to describe the decontamination methods to be specifically used and which areas on which they will be used. An generic table of choices is inadequate.*

Response:

Table 4-7 provides the detail requested.

*EK-16 Comment:*

*p32 - When will the demo plan be prepared?*

Response:

In compliance with AQCC Regulation 15, the Demolition Notification will be submitted 10 days prior to commencing with demolition.

*EK-17 Comment:*

*The plan will need CDPHE review and approval. Will the plan be submitted for public review?*

Response:

A Demolition Notification will be submitted prior to commencement of demolition. Demolition activities are described throughout the IM/IRA. To clarify, the IM/IRA has been revised by elaborating upon the discussion in Section 4.1.3.2, Demolition.

*EK-18 Comment:*

*It might be advisable to mention that demolition will proceed only after the building has been decontaminated to free-release standards.*

Response:

Decontamination of the "building" is assumed to achieve unrestricted release using the MARSSIM guidance. Any surfaces that do not meet the unrestricted release criteria will have appropriate steps taken to address these areas. Some examples would be to cut out portions of walls, apply fixatives, and cover portions of the foundation. The remedy will depend on the surface, demolition method, level of contamination, etc... An appropriate action will be selected when any areas are identified using the consultative process with the LRA.

*EK-19 Comment:*

*p34 - Please submit a copy of the 886 specific Health and Safety Plan for the CDPHE record.*

Response:

Because the HASP is a "living" document, CDPHE is welcome to review a controlled version of the HASP located in T886A. An uncontrolled copy of the document has been provided.

*EK-20 Comment:*

*p38 - Please add "awareness and adequate characterization to identify previously hidden contamination" to the preventative measure block of the "cut out piping systems" in the preliminary hazards analysis.*

Response:

The following text was added to the preventative measures block in Table 5-3: "Awareness of the possibility of encountering "hidden" contamination and adequate characterization to identify such contamination."

*EK-21 Comment:*

*p.40 - perform decon operations - Add "use engineering controls to reduce airborne contamination" to the preventative measures column.*

Response:

The following text was added to the preventative measures block in Table 5-3: "Use of appropriate engineering controls to reduce possible airborne contamination."

*EK-22 Comment:*

*p44, 45 - The commitments regarding air monitoring are of inadequate detail. If "an evaluation of the need for additional monitoring is to be performed prior to demolition", CDPHE must be part of this evaluation. The demolition air monitoring program must be reviewed and approved by CDPHE.*

*It is unlikely that a sampling program based on existing site monitoring stations alone will be approved. Monitoring, specific and most sensitive to the demolition project, will be needed.*

Response:

CDPHE APCD will be consulted in the evaluation of the need for additional monitoring prior to demolition. Special air monitoring, if required, will be identified and documented through the Integrated Monitoring Process.

*EK-23a Comment:*

*p55 - How will radioactive wastes be stored until transfer to approved RFETS storage buildings?*

Response:

Waste will be stored per existing site procedures and in accordance with applicable regulations. Some of the existing Site procedures that govern this activity include Solid Radioactive Waste Packaging, project specific Operations Orders, the Site RadCon Manual, and Waste Generator Instructions. The Operations Order and the WGI for the 20 foot waste container restrict the gram quantity and distribution of uranium that can be placed within the container.

Additionally, there has been a nuclear safety evaluation performed on the outside storage of LLW wooden crates. B886 does not currently store any wooden waste crates exterior to the building that are not inside of metal cargo containers or other buildings. The B886 Fire Hazard Analysis addresses external storage of wooden waste crates. The FHA states, "Although each of these represents a possible fire exposure, no hazard is posed to Building 886, due to the concrete exterior construction of the building."

*EK-23b Comment:*

*Has a hazards analysis been performed for storage of wastes in the 886 proximity? Is rad waste storage in the 886 complex evaluated in the new BIO?*

Response:

Waste will be stored per existing site procedures and in accordance with applicable regulations. Radioactive waste storage in the 886 complex is evaluated in the new BIO.

*EK-23c Comment:*

*Does an ops order exist to specify rad waste storage controls until the wastes are moved elsewhere onsite?*

Response:

Waste will be stored per existing site procedures and in accordance with applicable regulations.



## 13.0 REFERENCES

DOE 1992. *Historical Release Report for the Rocky Flats Plant*. Rocky Flats Environmental Technology Site, July.

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DOE 1996. *Rocky Flats Cleanup Agreement*. Rocky Flats Environmental Technology Site, July.

DOE 1997a. *RFETS RCRA Permit*. EPA Identification No. CO7890010526 June 30.

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NRC 1996. *Termination of Operating Licenses for Nuclear Reactors* NRC Guide 1.86.

RMRS 1997a. *Reconnaissance Level Characterization Report for the 886 Cluster Decommissioning Project*.  
RF/RMRS -97-100, Revision 0, November 13.

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